run 5

THE JOURNAL OF STRATEGIC STUDIES GROUP

Issue 5

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Featured in this Issue

- **Leyte Gulf** – a scenario for *Carriers at War*
- **Anzio** – a scenario for *Battlefront*
- **Arnhem** – a scenario for *Battlefront*
- Roger Keating on Game Programming
- *Patton vs Rommel* reviewed
- Hints on designing scenarios for *Battlefront*

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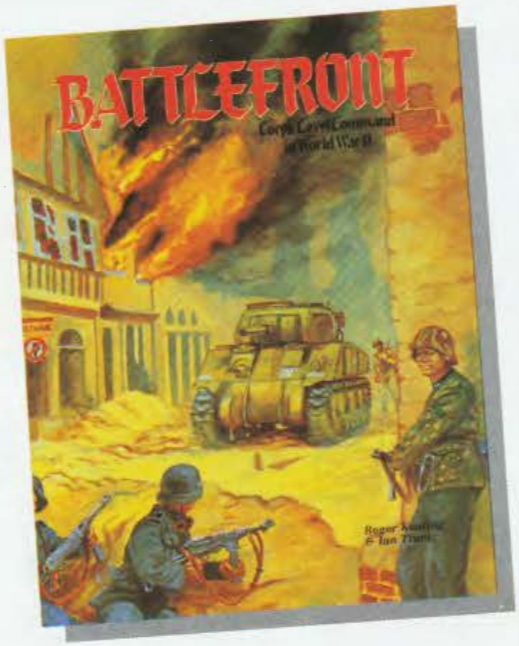

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Run 5

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EDITOR'S CHANCE

Well, there's been a bit of a mistake this issue. I don't have room for several of our regular features, namely letters, questions and answers and work in progress. As I'm sure you all realize, it wasn't my fault. That Roger waxed garrulous this issue and turned out a six page article instead of his usual three.

Normally I can edit an article to fit but in this case, since I barely understand any of it, I thought it might be a bit dangerous to mess around. I mean, something vital could get left out.

The programming techniques behind computer game design are fascinating in their own right and just as deserving of care as the historical models they are built to simulate. I keep a pretty close eye on strategy software from other publishers and it's my experience that there are very few games out there which avail themselves of the sort of tool Roger has explained in this issue; much to their detriment.

I expect to talk a bit more on the inter-relationships between programming and game design in the next issue. It's an interesting topic.

This issue is going to press three weeks earlier than scheduled (it was either that or two weeks late) and, among other omissions, we have not completed judging in the *Europe Ablaze* contest. We'll do that shortly and notify the winner in January. The winning scenario will still be published in our next issue.

Speaking of contests, have a look at the last issue for the details of our *Battlefront* contest. The deadline for entries is June 30th, 1987. As an aside, we have received a dozen entries already, including a simulation of the battle of Gettysburg!

Danny Stevens has joined the company and is presently working on Macintosh conversions of our games. We hope IBM and other formats will follow.

Russia is scheduled for release on January 20th and appears on target! It's our best game to date and you can take my word for it that the $40 it will cost you is money very well spent. *Road to Appomattox* will hopefully be ready in time for Origins '87, which is just about three years on from the time we first announced our intention of doing the game. Well, patience is its own reward and you can be sure that if by some cruel stroke of fate we are delayed further, it won't simply be to develop character in our customers.

This time we've got it right. . .
Notwithstanding anything we've said to the contrary in previous issues, the correct version numbers for *Carriers at War* are 1.2 for the C-64 format and 1.1 for the Apple format. Phew! ◆

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DESIGN HINTS FOR BATTLEFRONT

Designing a scenario is an activity with much to recommend it. It is your chance to simulate a part of history. The research, design and system manipulation are all interesting and rewarding tasks. We would wish to encourage as many people as possible to try their hand. It is really not as difficult as you might think.

It was not possible to include a detailed design treatment in the original *Battlefront* manual. (We ran out of time, Ed.) This article is meant to expand upon the manual, and will attempt to explain the essential aspects of design in more detail.

The first question to be addressed is that of absolutes. *Battlefront*, like any game system, is itself an abstraction of reality. It defines a structure into which scenario information must be fitted. You should not be too concerned about the manipulations of your source information which may be necessary to do this. Your sources themselves may be once or several times removed from reality, and a common sense approach will serve you best.

TERRAIN, MOVEMENT AND MAP CREATION.

This is actually a lot easier than it seems. The terrain in *Battlefront* is not as important as the number and quality of the troops defending. Exploiting the terrain setup is very difficult where you can't totally control your troops. Obviously, the basic terrain features should closely reflect the original and movement and combat values chosen as appropriate. There are no real rules for these values, as they depend so heavily on the type of troops present.

One area where care must be taken is in co-operating with the computer. Rivers and their crossing can present a problem. The river hexsides as defined in the game prevent movement by any mechanised unit except at bridge hexsides. Remember mechanised movement is not dependent on unit type, all units with a movement allowance greater than a specified minimum value, the 'MECH-MIN' use mechanised movement.

Roger's generalised movement routines are very good at finding their way unaided, but occasionally they can be tricked. Beware of little cul-de-sacs which suck units in and are hard to get out of. Block them off with river hex-sides, make them prohibited (zero movement point) terrain or provide a bridge out as appropriate. Sometimes the routines appreciate more than one bridge exit from a hex, don't be shy about providing it.

Sometimes a river may not be necessary. If units crossed it without any trouble, it may be better to just leave it out. Alternatively, strategically located rivers do an excellent job of channeling the advance of mechanised troops.

At other times you may not want anyone at all to cross a river, except at a bridge. In this case make a one hex wide river, using ocean (T0) terrain. Define a terrain type called 'BRIDGE' or whatever, with low movement costs, (it will probably be part of a road anyway), and place this type where you want the bridge(s). Crossing rivers is also important for supply. All HQ's use the 'MECH-MIN' value for movement and must be able to trace a mechanised supply path to their troops to create a line of supply.

The adjacent controlled hex penalty regulates how quickly your lead units will move through enemy controlled territory. This should be related to troop density and ease of control over the terrain.

UNIT CREATION

This is probably the hardest part of scenario design. Exact unit formations and strengths are often hard to come by. Boardgames, even if they don't cover the scenario exactly are often useful. Future *Run 5's* will also publish templates for the more common unit organisations. (There would have been some in this issue but we ran out of room, Ed.)

The critical part of unit creation is getting the structure right. As an example let us consider the different armoured divisions in the Bastogne scenario. The Americans have neatly divided theirs into three Combat Commands, each of which consists of one battalion each of tanks, mechanised infantry and self propelled artillery. The recon and engineer units along with the divisional artillery are left as divisional assets.

The German structure is quite different. In the 2nd Panzer XX, only one panzer grenadier regiment is mechanised, the other guys only get trucks. Assault guns (Stug III's) substitute for real tanks. The only real tanks, one battalion of Mk IV's and one of Mk V's are created as divisional assets. This arrangement gives a vital flexibility that makes up for a lot of shortcomings in actual equipment levels.

Obviously, the divisional assets are critical to a formation. Artillery should usually be an asset so all regiments can benefit. So should elite or special troops that can really make a difference in the battle.

The other values, like strength and rating, are relative, but the average strength of an infantry battalion would be between 9 and 11 and its rating around 9. These values are pretty standard but there are often good reasons to vary them. Airborne troops should get a lower rating simply because they can't carry everything they need with them. Elite units usually get more of everything. Garrison troops, militia, penal battalions or the dreaded Guadalcanal airfield construction troops are often lucky to have anything more than military picks.

The experience factor should be allocated with care. Remember, each word represents two numbers. Elite (7) troops can take horrific casualties (up to 80% on occasions) before they rout, and they recover quite quickly. They are also deadly in minor combat. Green (0) men can't even sleep without a light on. Very few troops were ever this bad. Even the Cons Bde on Guadalcanal, who were basically ditch diggers, rated a (1). Try to avoid the temptation to create one army of supermen, fighting another of devout pacifists.

The HQ factors are critical to the outcome of a scenario. An army of supermen are useless without bullets. The entire character of the

Guadalcanal scenario is determined by the Japanese Divisional Supply and Admin values which are exceptionally low. These values severely restrict the offensive capabilities of the more numerous and experienced Japanese who would otherwise probably push the Americans into the sea. Try it and see for yourself.

COMBAT

The combat routines in *Battlefront* embody the affect of supporting arms and combined arms. Bonuses are given in combat for the presence of supporting arms in the shape of artillery, off board support or heavy weapons capacity (any unit with a range greater than zero). Similarly a combined arms bonus is given for the presence of armour type units.

The presence of armour units, regardless of strength or ratings will have a definite bonus. These should always be disposed to give maximum flexibility. Similarly, the mere presence of artillery or OBS points makes a substantial difference to a combat. Since designation of divisional artillery as a battalion is probably an arbitrary matter, it is preferable, if there is the room, to create two artillery units rather than one. This again gives more flexibility, although this extra flexibility may not always be warranted, or possible.

CO-OPERATING WITH THE COMPUTER

A large number of *Battlefront* scenarios will be played solitaire. Unless you are trying to simulate particularly queer battles, you should be able to manage a decent solitaire playability.

We have already discussed how terrain choices can control the course of a battle. The first choice is actually the location of the terrain. You will have noticed how the Americans in Guadalcanal suffer from their restricted beach-head. The map edge will perform the same restrictive function. A division in *Battlefront* likes a depth of about eight hexes in which to operate unhindered. It should not be deprived of this room to manoeuvre without good cause.

The location and arrival times of HQ's are important. The location of a HQ determines the axis of communications and supply for your regiments. Units will move along this axis to go into reserve, and routers will more or less try to achieve the same thing. HQ's will try to stay away from the edge of the map and from enemy forces. Unless you have a very good reason otherwise, you should make these tasks as easy as possible.

Supply is the other major function for HQ's. Avoid situations where HQ's get trapped by terrain features, putting their units out of supply. On the other hand, delaying the arrival of a HQ can often solve a number of problems. Without a HQ, units are out of supply and far less likely to get too aggressive. This can often be necessary where elements of a division straggle onto the map over a number of turns. The first units need to be there, but have to be restrained for a period of time.

Another way to hold back units is to have them start the game fatigued. The Argentine units in the Task Force South scenario are meant to wait for the British to arrive and start beating them up. Unfortunately, it is hard for the *Battlefront* system to reflect the total passivity of the Argentine High Command. The Argies used to leave their excellent defensive terrain and pour forth to meet the British, hastening their own demise even further. Having them start the game tired soon cured them of this habit, and they now wait patiently to be attacked. Of course units can also be created with fatigue to reflect combat prior to the start of the scenario.

There are two major factors which motivate the computer, the Victory Points derived from Objective Hexes and the location of enemy units. Each turn the computer calculates the Victory Points as they would be if the game ended then. These are also displayed for your benefit. The computer uses this as a guide to its progress in the game. If it is well behind, then it is more likely to be aggressive to try and make up the deficit.

However, this is only one input to the decision making process. Nevertheless, the choice of Objective Hexes and the VP's associated with them are critical. (Probably you knew this). It should be possible, by choosing correct start and end times, and adjusting the points per turn and end of game points to more or less lead the computer by the nose. You may be reassured to note that with any given scenario and its desired behaviour, there are multiple hex/VP solutions.

One thing that we may have neglected to tell you will help. If the game is running in OBSERVE mode then pressing the (esc/f1) key while the game displays the 'running' message will cause the game to halt at the end of the turn. Orders and status of units can then be checked mid-game.

The other stimulus is harder to control. It is an integral part of the *Battlefront* system that all units usually want to get to grips with the bad guys. This reflects our belief in the the difficulties of ignoring uncommitted enemy forces. This occassionally leads to difficulties as units ignore their objectives and pile into the bad guys, who may already be being dealt with by other units.

If this is the case you will have to deal with it. Perhaps the bad guys are destined to be killed soon and their removal will free things up, in which case a slight elasticity with time and victory conditions may achieve the same effect. Maybe a closer point can be made into the vital hex in VP terms with the historical point being included but no longer vital.

Zero movement point units, representing flak units or garrison troops can act as bait. Objective hexes are sometimes necessary simply as navigational beacons. Do not put objective hexes too close to reinforcement hexes, unless you really want the units trying to get on to be chewed up or delayed forever.

CO-OPERATE WITH YOURSELF

The test of a *Battlefront* scenario is how closely it simulates a chosen piece of military history. It is usually no trouble to simulate the final result of any engagement. With *Battlefront* we have tried to go further and simulate some of the processes involved in reaching that result. This is why we have placed such emphasis on conditions like supply and fatigue, and why we restrict command and manoeuvre decisions. We are trying to place you under the same constraints, and to give you the same sort of military choices as the original combatants.

The overriding test of any scenario creation then becomes whether it agrees with this philosophy. Numbers for parameters like strength or rating are not as important as how those troops are employed, and what choices are open to them. The perfect OB does not guarantee a perfect scenario. A map is only there to reflect ground conditions, as they affected the fighting.

Co-operate with yourself. Do the best you can on the little numbers, but concentrate on the big picture. ◆

LEYTE GULF

The Last Battle

22nd - 27th October, 1944

A SCENARIO FOR

CARRIERS AT WAR

By Kenneth G. Wastrack

Twenty-nine months after the fall of Corregidor, MacArthur's promise to return to the Philippines became a reality. The fall of the Philippines would split the Japanese Empire in two and sever Japan's sea lanes with the Southern Resource Area. With oil resources cut off from the factories and repair yards of Japan, the Imperial fleet would become impotent. In one last, desperate attempt to stave off disaster, virtually the entire Navy was committed to. . . the final battle.

THE SITUATION

The capture of the Marianas Islands in mid-1944 breached the main defense perimeter of the Japanese Empire and placed the home islands within range of long-range bombers. The Allies now adopted a strategy of blockade to cut enemy sea communications until the defeat of Germany freed sufficient ground troops for a direct invasion of Japan. The first landing on Leyte (on the western side of Leyte Gulf) would provide a staging area for the main assault on Luzon. The original plan called for a preliminary invasion of Mindanao to obtain bases for land-based air support, however, pre-invasion raids by Third Fleet (Halsey) encountered weak air opposition, so the Mindanao invasion was cancelled. Air support for the Leyte invasion was provided almost entirely by carrier-based aircraft until air bases were established on Leyte. The invasion itself was covered by Seventh Fleet (Kincaid); including six old battleships (five of which had been at Pearl Harbour on December 7, 1941) for gunfire support and a number of escort carriers for close air support. Third Fleet, with its fast carriers and battleships, provided distant air cover and watched for the approach of enemy fleet units.

The Japanese Navy had developed a series of plans to respond to possible Allied invasions of key areas in the Empire. The Battle of the Philippine Sea (during the Marianas campaign) effectively destroyed Japanese carrier-based airpower, so the Japanese carrier force (Ozawa) would become a decoy to attract Third Fleet away from the invasion zone. The still strong Japanese battleship/cruiser forces (Kurita, Nishamura and Shima) would fall on the Seventh Fleet and do as much damage as possible to the Allied transport and support forces. The desperation of the Japanese plan to get into Leyte Gulf is emphasized by the lack of any real provisions for getting back out again in the face of the Third Fleet (which was sure to respond with a vengeance). However, the cost was acceptable to the Japanese because a failure to act would quickly result in an immobilized fleet. Had the plan succeeded, future Allied invasions could have been delayed for months until the lost amphibious shipping was replaced.

On October 23, 1944, the Battle of Leyte Gulf opened when two U.S. submarines sighted the main Japanese battleship force west of the Philippines. After warning the the forces covering the invasion, the submarines sank two heavy cruisers and disabled a third. The next day, Third Fleet

The cover painting by Mitch Lovett shows 3 SB2C Helldivers from VB-7 (aboard the USS Hancock) peeling over to begin an attack on a Japanese aircraft carrier, probably the Chiyoda, in the Battle of Leyte Gulf.

AMERICAN ORDER OF BATTLE

NAVAL FORCES

TASK FORCE 0 (Halsey)

Task Group 1
3 CV - Hornet, Hancock, Wasp*
2 CVL - Monterey, Cowpens
3 CA - Chester (CA27), Salt Lake City (CA25), Pensacola (CA24)
2 CLA - Oakland (CLA95), San Diego (CLA53)
13 DD

Task Group 2
1 CV - Intrepid*
2 CVL - Cabot, Independence
8 DD

Task Group 3
2 CV - Lexington, Essex*
2 CVL - Langley, Princeton
1 CL - Birmingham (CL62)
1 CLA - Reno (CLA96)
9 DD

Task Group 4
2 CV - Enterprise, Franklin*
2 CVL - San Jacinto, Bell. Wood
9 DD

Task Group 5
2 BB - Iowa (BB61), New
2 CVL - Jersey** (BB62)
3 CL - Vincenes (CL64), Miami
1 CLA - (CL89), Biloxi (CL80)
8 DD

Task Group 6
4 BB - Washington (BB56), Massachusetts (BB59), South Dakota* (BB57), Alabama (BB60)
4 DD

Task Group 7
2 CA - Witchita (CA45), New Orleans (CA32)
2 CL - Mobile (CL63), Santa Fe* (CL60)
6 DD

TASK FORCE 1 (Kinkaid)

Task Group 8
2 CVE - Taffy 1.1*, Taffy 1.2
3 DD
2 DE

Task Group 9
3 CVE - Taffy 2.1*, Taffy 2.2, Taffy 2.3
3 DD
4 DE

Task Group 10
3 CVE - Taffy 3.1*, Taffy 3.2, Taffy 3.3
3 DD
4 DE

Task Group 11
6 BB - Mississippi* (BB41), Maryland (BB46), West Virginia (BB48), Tennessee (BB43), California (BB44), Pennsylvania (BB38)
6 DD

Task Group 12
3 CA - Portland (CA33), Louisville* (CA28), Minneapolis (CA36)
2 CL - Denver (CL58), Columbia (CL56)
10 DD

Task Group 13
1 CA - Shropshire (CA73)
2 CL - Boise (CL47), Phoenix (CL46)
1 AGC - Wasatch** (AGC9)
5 DD
8 APA
8 AP

AIR FORCES

NAVAL AIR

Wasp - 42 F6F-3, 12 F6FN, 24 SB2C3, 15 TBF1C
Hornet - 42 F6F-3, 24 SB2C3, 18TBM1C
Hancock - 42 F6F-5, 39 SB2C3, 18 TBM1C
Intrepid - 36 F6F-5, 6 F6FN, 27 SB2C3, 18 TBM1C
Essex - 42 F6F-3, 9 F6FN, 24 SB2C3, 18 TBF1C
Lex'ton - 42 F6F-5, 30 SB2C3, 18TBM1C
Franklin - 36 F6F-5, 9 F6FN, 30 SB2C3, 15 TBM1C
Enterpr. - 30 F6F-5, 33 SB2C3, 18 TBM1C
Mon'rey - 24 F6F-5, 9 TBM1C
Cowpens - 24 F6F-5, 9 TBM1C
Indepen. - 18 F6FN, 9 TBM-N
Cabot - 21 F6F-5, 9 TBM1C
Langley - 24 F6F-3, 9 TBM1C
San Jac. - 18 F6F-3, 9 TBM1C
Prin'ton - 24 F6F-3, 9 TBM1C
B. Wood - 24 F6F-3, 9 TBM1C
Taf 1.1 - 39 F6F-3, 18 TBM1C
Taf 1.2 - 39 FM-2, 21 TBM1C
Taf 2.1 - 30 FM-2, 24 TBM1C
Taf 2.2 - 27 FM-2, 21 TBM1C
Taf 2.3 - 30 FM-2, 21 TBM1C
Taf 3.1 - 33 FM-2, 24 TBM1C
Taf 3.2 - 30 FM-2, 24 TBM1C
Taf 3.3 - 30 FM-2, 24 TBM1C

LAND BASED AIR

Theatre 0 (Kenney)
Peleliu - 21 F4U-4, 18 B-24J, 18 PBY5A
Morotai - 36 P-38J, 15 B-26G, 15 PBY5A

search planes sighted this battleship ("centre") force heading for San Bernadino Strait (off the southeast end of Luzon) and the smaller battleship/cruiser ("southern") force bound for Surigao Strait (between Mindanao and Leyte). The carrier ("northern") force coming from Japan was not yet sighted. The main battle was about to begin.

On October 24, Third Fleet had only three of its four carrier task groups available; the strongest group, several hundred miles to the east for replenishment, was en route toward the battle area. Even so, Third Fleet was able to launch numerous air attacks against the centre force. One battleship was sunk and several other ships were damaged before the centre force reversed course toward the west. Simultaneously, Japanese land-based air attacks against Third Fleet managed to sink one American light carrier, but inflicted little other damage.

While this was going on, American search planes sighted the northern force. Since the Seventh Fleet was more than adequate to handle the southern force, and since pilot reports indicated the centre force was badly damaged and in retreat, the entire Third Fleet moved northward to destroy the Japanese carriers. Because of misunderstood communications, Seventh Fleet incorrectly thought a major part of Third Fleet was still watching San Bernadino Strait. The northern force had fulfilled its decoy role.

Seventh Fleet, thinking that Third Fleet was covering all northern approaches to Leyte

Continued on p.8

LEYTE GULF

SCENARIO 10

Leyte Gulf

22 Oct - 27 Oct, 1944

ALLIED BASES - Peleliu, Morotai, Tucloban, Dulag

IJN BASES - Okinawa, Formosa, Hong Kong, Brunei, Malaybalay, Tuguegrao, Clark Field, Manila, Legaspi, Yap, Bacolod, Butuan, Tarakan, Davao

JAPANESE ORDER OF BATTLE

NAVAL FORCES

TASK FORCE 0 (Ozawa)

Task Group 1 (23rd Oct.)

1 CV - Zuikaku**
1 CVL - Zuiho
2 CVE - Chitose, Chiyoda
2 CL - Tama (CL7), Isuzu (CL9)
4 DD

Task Group 2 (23rd Oct.)

2 BB - Ise* (BB4), Hyuga (BB3)
1 CL - Oyoda (CL25)
4 DD

TASK FORCE 1 (Kurita)

Task Group 3 (23rd Oct.)

3 BB - Yamato (BB8), Musashi (BB7), Nagato (BB6)
6 CA - Atago** (CA9), Takao (CA12), Chokai (CA10) Maya (CA11), Myoko (CA7), Haguro (CA6)
1 CL - Noshiro (CL22)
9 DD

Task Group 4 (23rd Oct.)

2 BC - Kongo8 (BC4), Haruna (BC1)
4 CA - Kumano (CA13), Suzuya (CA16), Chikuma (CA17), Tone (CA18)
1 CL - Yahagi (CL24)
6 DD

TASK FORCE 2 (Nishi.)

Task Group 5 (23rd Oct.)

2 BB - Yamashiro** (BB2), Fuso (BB1)
1 CA - Mogami (CA15)
4 DD

TASK FORCE 3 (Shima)

Task Group 6 (23rd Oct.)

2 CA - Ashigara (CA5), Nachi (CA8)
1 CL - Abukuma (CL8)
7 DD

AIR FORCES

NAVAL AIR

Zuikaku - 51 Zero1, 27 Zerob,
Zuiho - 6 Jill, 3 Pete
Chitose - 24 Jill
Chiyoda - 6 Judy
Chikuma - 3 Jake
Tone - 3 Jake
Mogami - 3 Jake

LAND BASED AIR

Theatre 0 (Fukudome)

Formosa - 36 Zero2, 36 Val, 24 Betty, 24 Kate, 12 Mavis
Hong K. - 48 Zero2, 36 Val, 24 Betty, 24 Kate 12 Mavis
Brunei - 24 Zero2, 18 Val, 12 Betty, 12 Jill, 6 Mavis
Tarakan - 18 Zero2, 18 Val, 18 Betty, 12 Jill, 6 Mavis
Legaspi - 36 Zero2, 15 Zerob, 6 Jill, 6 Judy
Butuan - 36 Zero2, 15 Zerob, 6 Val, 6 Jill
Davao - 36 Zero2, 18 Betty, 9 Jill, 9 Val
Yap - 18 Zero2, 12 Betty

Theatre 1 (Kakuta)

Okinawa - 30 Oscar, 36 Tony, 24 Peggy, 12 Babs
Tu'grao - 6 Oscar, 6 Grace
Clark F. - 24 Oscar, 12 Peggy, 12 Sally, 6 Babs
Manila - 24 Oscar, 12 Peggy, 12 Sally
Bacolod - 12 Tony, 12 Grace
Malay'ay - 12 Tony, 12 Grace

Continued from p.6

Gulf, turned its full attention towards the southern force attempting to penetrate Surigao Strait into Leyte Gulf. During the night of October 24-25, the southern force was overwhelmed in a textbook battle that was the last surface action ever fought between battleships. The Japanese lost two battleships, one heavy cruiser and three destroyers; the Americans had lost nothing larger than a PT boat. Seventh Fleet had destroyed the southern force; Third Fleet was about to destroy the northern force. Everything seemed secure.

As October 25 dawned, a small escort carrier group from Seventh Fleet with the radio call-sign 'Taffy 3', was operating east of Leyte Gulf to provide close air support for the ground forces on Leyte. Suddenly, a force of Japanese combat ships was detected on the horizon; it was the centre force which had reversed course again, passed through the unguarded San Bernadino Strait, and was now only a short distance from Leyte Gulf. Taffy 3, consisting of only six escort carriers and seven destroyers/destroyer escorts, was all that stood between the invasion forces and a Japanese force of four battleships, eight cruisers and eleven destroyers. The most dramatic phase of the Battle for Leyte Gulf had begun.

In a desperate two-and-a-half hour battle, Taffy 3 and its companion escort carrier groups fought back against the Japanese forces. The Japanese, thinking they were fighting the main combat elements did not know their plan was close to success. Confused and without accurate information about the location of American forces, the centre force turned back towards San Bernadino Strait, first to regroup before a new attack and eventually to retreat for good.

American losses in the battle were one escort carrier, two destroyers and one destroyer escort sunk compared with three Japanese heavy cruisers sunk. One additional escort carrier was sunk in the first kamikaze air attack of the war.

While Taffy 3 was fighting for its life, Third Fleet was beginning the expected destruction of the northern force. However, shortly after the first air strike was launched, Third Fleet received word of the battle being waged between centre force and Taffy 3. After a number of frantic requests for help, the fast battleships turned south toward Leyte Gulf, leaving only a part of Third Fleet to face the northern force. The result was a partial victory; four Japanese aircraft carriers were sunk, but the bulk of the northern force escaped. Meanwhile, the centre force reached San Bernadino Strait a couple of hours ahead of the Third Fleet battleships and also escaped, except for a straggling destroyer that was easily sunk. Allied air attacks claimed more Japanese ships in the days that followed.

The final tally was 28 Japanese ships lost compared to only six American ships sunk;

LEYTE GULF - Task Groups

TASK GROUP #	1-23	1 (AX)	2 (AX)	3 (AX)	4 (AX)	5 (AX)	6 (AX)	1 (AL)	2 (AL)	3 (AL)	4 (AL)	5 (AL)	6 (AL)	7 (AL)	8 (AL)
FLAGSHIP	[-]	Zuikaku	BB 4	BB 8	BC 4	BB 2	CL 8	Wasp	Intrepid	Essex	Franklin	BB 62	BB 59	CL 60	Taffy 1.1
TOTAL SHIPS	[-]	10	7	19	13	7	10	23	11	15	13	13	8	10	7
OBJECTIVE	1-23	21	21	22	22	23	23	22	1	1	1	1	1	1	22
MISSION	0-7	0	3	4	2	4	4	1	1	1	1	0	1	1	1
HEADING	0-7	4	4	1	1	2	3	7	0	0	0	0	0	0	6
ENDURANCE	0-31	15	15	18	18	18	15	20	22	21	22	22	22	22	15
TF NUMBER	0-3	0	0	1	1	2	3	0	0	0	0	0	0	0	1
TF ADMIN	0-3	3	3	2	2	2	2	2	2	3	2	3	2	2	2
ARRIVAL DATE	0-9	1	1	1	1	1	1	3	0	0	0	0	0	0	0
TF COMMAND	Y/N	Y	N	Y	N	Y	Y	N	N	N	N	Y	N	N	N
START AREA	(x,y)	48,0	48,0	0,46	0,46	4,58	0,37	69,58	49,37	49,34	49,40	49,34	49,40	49,37	46,49
SEARCH PAT.	Y/N	SE-SW	-	-	E-S	N-E	-	W-N	SW-NW	NW-NE	SE-SW	-	-	-	SE-SW

TASK GROUP #	1-23	9 (AL)	10 (AL)	11 (AL)	12 (AL)	13 (AL)
FLAGSHIP	[-]	Taffy 2.1	Taffy 3.1	BB 41	CA 28	AGC 9
TOTAL SHIPS	[-]	10	10	12	15	25
OBJECTIVE	1-23	22	22	22	22	22
MISSION	0-7	1	1	1	1	5
HEADING	0-7	6	6	6	6	6
ENDURANCE	0-31	15	15	12	12	20
TF NUMBER	0-3	1	1	1	1	1
TF ADMIN	0-3	2	2	3	2	3
ARRIVAL DATE	0-9	0	0	0	0	0
TF COMMAND	Y/N	N	N	N	N	Y
START AREA	(x,y)	46,46	46,43	42,46	42,46	41,44
SEARCH PAT.	Y/N	SW-NW	NW-NE	-	-	-

LEYTE GULF - Length

START HOUR	0-23	22
START DAY	1-31	22
MONTH	1-12	10
YEAR	0-55	44
DAWN	3-10	5

DUSK	15-22	19
END HOUR	0-23	20
END DAY	1-9	5
FORECAST	0-3	3

LEYTE GULF - Carriers

CARRIER NUM.	1-31	1	2	3	4	5	6	7	8	9	10	11	12	13	14
CARRIER NAME	[11]	Wasp	Hornet	Hancock	Intrepid	Essex	Lexington	Franklin	Enterprise	Monterey	Cowpens	Indep'dence	Cabot	Langley	Princeton
AIR CAPACITY	1-127	100	100	100	100	100	100	100	81	45	45	45	45	45	45
CLASS NUM.	1-63	2	2	2	2	2	2	2	1	3	3	3	3	3	3
TASK GROUP	1-23	1	1	1	2	3	3	4	4	1	1	2	2	3	3
ASSIGN. SQNS	[5]	1,17,20,28	2,21,29	3,22,30	4,18,23,31	5,24,32,48	6,25,33	7,26,34,49	8,27,35	9,36	10,37	19,51	11,38	12,39	13,40
SPOT NUMBER	0-31	11	11	11	11	11	11	11	8	5	5	5	5	5	5
DAM. STATUS	0-15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
RADAR	0-7	6	6	6	6	6	6	6	6	6	6	6	6	6	6
DAM. CONTROL	0-3	2	2	2	2	2	2	2	2	2	2	2	2	2	2
AA ACCURACY	0-3	2	2	2	2	2	2	2	2	2	2	2	2	2	2

CARRIER NUM.	1-31	15	16	17	18	19	20	21	22	23	24	28	29	30	31
CARRIER NAME	[11]	San Jacinto	Belleau Wood	Taffy 1.1	Taffy 1.2	Taffy 2.1	Taffy 2.2	Taffy 2.3	Taffy 3.1	Taffy 3.2	Taffy 3.3	Zuikaku	Chitose	Chiyoda	Zuiho
AIR CAPACITY	1-127	45	45	66	66	56	56	56	56	56	56	84	33	33	33
CLASS NUM.	1-63	3	3	4	4	5	5	5	5	5	5	41	43	43	42
TASK GROUP	1-23	4	4	8	8	9	9	9	10	10	10	1	1	1	1
ASSIGN. SQNS	[5]	14,41	15,42	16,52	54,62	55,63	43,64	44,65	45,66	47,50	46,53	74,75	76	78	77,79
SPOT NUMBER	0-31	5	5	6	6	6	6	6	6	6	6	7	3	3	3
DAM. STATUS	0-15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
RADAR	0-7	6	6	3	3	3	3	3	3	3	3	2	2	2	2
DAM. CONTROL	0-3	2	2	1	1	1	1	1	1	1	1	2	1	1	1
AA ACCURACY	0-3	2	2	2	2	2	2	2	2	2	2	2	1	1	1

unquestionably a major victory for the Allied navies.

The Battle for Leyte Gulf was the biggest naval battle of modern times with nearly 300 ships involved at one point or another. The Japanese Navy suffered a major defeat and never posed a major threat for the rest of the war. However, the difference between defeat and victory was small; different decisions at critical points in the battle could have changed the course of history.

THE SCENARIO

This scenario covers the period when the main portions of the battle took place. The American forces start on the map except for one Third Fleet task group that arrives on October 25. All Japanese units arrive on October 23. Between October 22 and October 27, the Japanese battleships must avoid the American fast carrier forces and reach their destination in Leyte Gulf, slaughter the invasion forces and, if possible, escape. Some adjustments were necessary to achieve a playable game that is faithful to history. These included.

1. Representing two historical escort carriers as one aircraft carrier (Taffy 1.1, Taffy 1.2, Taffy 2.1 etc.) to fit within the system limit of 31 total carriers.

2. Abstractly representing ships that did not have a major impact on the battle - 8

LEYTE GULF - Squadrons

SQUADRON #	1-126	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
PLANE TYPE	1-63	1	1	13	13	1	13	13	13	13	13	13	1	1	1	1	1	2	2	2	3	3	3	3	3
# OF AIRCRAFT	1-63	42	42	42	36	42	42	36	30	24	24	21	24	24	18	24	39	12	6	18	24	24	39	27	24
EXHAUSTION	0-7	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5	5	5	5
EXPERIENCE	0-3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	3
ADMIN	0-3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	3
RECON OPS	Y/N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
NIGHT OPS	Y/N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	N	N	N	N	N
CARRIER OPS	Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

SQUADRON #	1-126	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
PLANE TYPE	1-63	3	3	3	4	6	6	6	4	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	2
# OF AIRCRAFT	1-63	30	30	33	15	18	18	18	18	18	15	18	9	9	9	9	9	9	9	21	21	24	24	24	9
EXHAUSTION	0-7	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	5
EXPERIENCE	0-3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	3
ADMIN	0-3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	3
RECON OPS	Y/N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
NIGHT OPS	Y/N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y
CARRIER OPS	Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

SQUADRON #	1-126	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
PLANE TYPE	1-63	2	12	5	6	12	6	6	7	7	8	9	10	11	12	12	12	12	12	30	30	26	23	24	25
# OF AIRCRAFT	1-63	9	30	9	18	30	21	24	15	18	36	21	15	18	39	30	27	30	33	3	3	12	36	36	24
EXHAUSTION	0-7	5	4	5	4	4	4	4	4	4	4	6	5	5	4	4	4	4	4	6	6	6	5	4	5
EXPERIENCE	0-3	3	2	3	2	2	2	2	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2
ADMIN	0-3	3	2	3	2	2	2	2	3	3	3	3	3	3	2	2	2	2	2	2	2	2	3	2	3
RECON OPS	Y/N	N	N	Y	Y	N	Y	Y	Y	Y	N	N	N	Y	N	N	N	N	N	Y	Y	Y	N	N	Y
NIGHT OPS	Y/N	Y	N	Y	N	N	N	N	Y	Y	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	Y
CARRIER OPS	Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	N	Y	Y	Y	Y	Y	N	N	N	N	N	N

SQUADRON #	1-126	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96
PLANE TYPE	1-63	27	14	15	16	16	17	18	19	20	21	22	26	23	24	25	27	24	23	25	16	26	24	23	25
# OF AIRCRAFT	1-63	24	51	27	24	6	6	3	30	36	24	12	12	36	48	24	24	24	18	12	12	6	18	18	18
EXHAUSTION	0-7	5	7	7	7	7	7	7	4	4	5	5	6	6	6	6	6	7	7	7	7	6	7	5	6
EXPERIENCE	0-3	2	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	1	1	2	2	3	1	2	2
ADMIN	0-3	3	3	3	3	3	3	3	2	2	2	3	2	3	2	3	3	2	2	2	2	2	2	2	3
RECON OPS	Y/N	N	N	N	N	N	Y	Y	N	N	N	Y	Y	N	N	Y	N	N	N	N	N	Y	N	N	Y
NIGHT OPS	Y/N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	Y	N	N	N	N	N	Y	N	N	Y
CARRIER OPS	Y/N	N	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

SQUADRON #	1-126	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
PLANE TYPE	1-63	16	26	19	29	19	21	28	22	28	19	21	24	15	16	17	20	29	24	15	23	16	20	29	24
# OF AIRCRAFT	1-63	12	6	6	6	24	12	12	6	12	24	12	36	15	6	6	12	12	36	15	6	6	12	12	36
EXHAUSTION	0-7	6	6	4	4	4	7	7	5	7	4	7	4	7	5	5	7	5	6	7	5	5	5	5	5
EXPERIENCE	0-3	2	2	2	2	2	1	1	2	1	2	1	2	1	2	2	2	2	1	1	2	2	1	2	2
ADMIN	0-3	2	2	2	3	2	2	2	3	2	2	2	2	3	3	3	2	3	3	3	2	3	2	3	2
RECON OPS	Y/N	N	Y	N	N	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
NIGHT OPS	Y/N	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
CARRIER OPS	Y/N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

SQUADRON #	1-126	121	122	123	124	125	126
PLANE TYPE	1-63	25	16	23	24	25	30
# OF AIRCRAFT	1-63	18	9	9	18	12	3
EXHAUSTION	0-7	6	5	5	6	6	6
EXPERIENCE	0-3	2	2	2	1	2	2
ADMIN	0-3	3	3	3	2	2	2
RECON OPS	Y/N	Y	N	N	N	Y	Y
NIGHT OPS	Y/N	Y	N	N	N	Y	N
CARRIER OPS	Y/N	N	N	N	N	N	N

NOTE - The shortage of seaplanes aboard Japanese capital ships in this scenario is due the squadron limit. However, Japanese bases, coastwatchers and an abundance of land-based search planes more than compensate for this shortfall.

LEYTE GULF - Weather

MAP SECTOR	[12]	1	2	3	4	5	6	7	8	9	10	11	12
CONDITION	0-3	0	1	0	0	0	0	0	0	1	1	0	0
DIRECTION	0-7	0	0	1	6	3	7	1	0	0	1	6	3
RELIABILITY	0-1	0	0	0	1	1	1	0	1	0	0	1	0

APA and 8 AP class ships with slightly stronger defensive values to represent the much larger number of vessels actually present in Leyte Gulf.

3. Setting the Seventh Fleet command task group (TG 13) to a speed of 0 (AGC ship speed) to maintain the Seventh Fleet historical role of protecting the forces in Leyte Gulf.

The key thing that must be recognized in playing this game is the victory conditions (see below). The Japanese were willing to

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LEYTE GULF - Bases

BASE NUMBER	1-23	1	2	3	4	5	6	7	8	9	10	11	12	13	14
BASE NAME	[11]	Okinawa	Formosa	Hong Kong	Brunei	Tarakan	Tuguegrao	Clark Field	Manila	Legaspi	Bacolod	Butuan	Malaybalay	Davao	Yap
LOCATION	(x,y)	49,0	24,6	2,6	4,58	14,71	27,21	24,29	26,32	36,36	33,45	41,51	41,55	43,58	83,48
ASSIGNED SQNS	[10]	80-83	69-73	84-88	89-93	94-98	99-100	101-104	105-107	108-111	112-113	114-117	118-119	120-123	124-125
HEAVY AA	0-31	12	12	15	4	10	4	12	12	12	4	10	6	6	12
LIGHT AA	0-31	12	12	15	9	12	9	12	12	15	6	15	10	8	15
SPOT NUMBER	0-31	15	15	15	6	8	4	15	15	12	6	12	6	15	8
DAM. STATUS	0-15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
AIRSTRIP	0-7	7	7	7	6	3	2	7	7	5	3	4	2	5	3
RADAR	0-7	2	2	2	2	2	1	2	2	2	1	2	0	2	0
AA ACCURACY	0-3	1	1	1	1	1	1	1	2	1	1	1	1	1	1
DAM. CONTROL	0-3	1	1	1	1	2	1	1	2	1	2	1	2	1	1
THEATRE	0-1	1	0	0	0	0	1	1	1	0	1	0	1	0	0
ALLIED	Y/N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
FIGHTER FAC.	Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
BOMBER FAC.	Y/N	Y	Y	Y	N	Y	N	Y	Y	Y	N	Y	N	Y	Y
PORT FAC.	Y/N	Y	Y	Y	Y	N	N	N	Y	N	N	N	N	Y	Y
SEARCH PAT.	Y/N	E-S	SE,S	E,SE	NE,E	NE,E	-	NE-SE	-	-	-	-	-	N-SE	W,NW

BASE NUMBER	1-23	15	16	17	18
BASE NAME	[11]	Peleliu	Morotai	Tuclobon	Dulag
LOCATION	(x,y)	69,59	47,69	40,44	40,45
ASSIGNED SQNS	[10]	57,59,61	56,58,60	-	-
HEAVY AA	0-31	15	10	0	0
LIGHT AA	0-31	15	15	5	5
SPOT NUMBER	0-31	10	10	4	4
DAM. STATUS	0-15	15	15	12	15
AIRSTRIP	0-7	4	4	2	2
RADAR	0-7	6	6	0	0
AA ACCURACY	0-3	2	2	1	1
DAM. CONTROL	0-3	2	2	2	2
THEATRE	0-1	0	0	0	0
ALLIED	Y/N	Y	Y	Y	Y
FIGHTER FAC.	Y/N	Y	Y	Y	Y
BOMBER FAC.	Y/N	Y	Y	N	N
PORT FAC.	Y/N	Y	N	N	N
SEARCH PAT.	Y/N	W-N	NW-NE	-	-

LEYTE GULF - Briefing

NATIONALITY		AXIS	ALLIED
MORALE	0-3	3	2
PASSIVE ASW	0-3	1	3
FIRE CONTROL	0-3	2	3
INVASION MULT.	0-3	0	0
RADAR TECH.	0-3	0	3
AERIAL TORPS	0-3	3	2
SURF. TORPS	0-3	3	2
SUB. TORPS	0-3	3	3
ABORT DIRECT.	0-7	5	2

NATIONALITY		AXIS	ALLIED
SURPRISED	Y/N	N	N
PARA-FRAGS	Y/N	N	Y
CLEAR MAP PTS	YI	Y	Y
COASTWAT. #1	(x,y)	70,58	28,18
COASTWAT. #2	(x,y)	40,46	23,31
COASTWAT. #3	(x,y)	40,40	22,40
COASTWAT. #4	(x,y)	46,65	43,61
ANCHOR PT #1	(x,y)	-	-
ANCHOR PT #2	(x,y)	-	-

LEYTE GULF - Plane Types

PLANE NUMBER	1-63	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PLANE TYPE	[5]	F6F-3	F6F5N	SB2C3	TBF1C	TBM-N	TBM1C	PBY5A	P-38J	F4U-4	B-26G	B-24J	FM-2	F6F-5	ZERO 1	ZERO B
ROLE	0-2	0	0	1	1	1	1	2	0	0	1	1	0	0	0	1
CREW	0-5	0	0	1	2	2	2	5	0	0	4	5	0	0	0	0
RANGE (n,e,t)	0-31	4,7,9	4,6,9	4,6,7	7,9,12	7,9,12	7,9,12	14,18,24	2,6,12	3,5,7	3,5,8	7,10,16	3,5,7	4,6,9	4,7,9	3,5,6
ALT. (h,m,l)	0-3	3,3,3	3,3,2	1,3,3	0,3,3	0,3,3	0,3,3	0,3,3	3,3,1	3,3,1	0,3,3	1,3,2	2,3,2	3,3,2	3,3,2	3,3,2
CRUIS. SPEED	0-15	7	7	7	7	7	7	5	13	9	11	9	7	7	10	10
BOMB LOAD	0-63	4	7	7	7	7	7	7	11	7	16	43	1	7	1	2
CHAR. (f,v,m,p)	0-7	5,5,5,4	5,5,5,4	4,4,4,2	2,4,4,1	2,4,4,1	4,4,4,1	3,2,0,0	5,4,5,6	5,5,6,6	3,4,1,3	6,5,0,2	5,4,5,3	5,5,5,4	4,2,7,4	5,4,6,4
ALLIED	Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N
CARRIER	Y/N	Y	Y	Y	Y	Y	Y	N	N	N	N	N	Y	Y	Y	Y
SEAPLANE	Y/N	N	N	N	N	N	N	Y	N	N	N	N	N	N	N	N
TORPEDO	Y/N	N	N	N	Y	Y	Y	Y	N	N	Y	N	N	N	N	N
NIGHT	Y/N	N	Y	N	N	Y	N	Y	N	N	N	N	N	N	N	N
ANTI-SUB.	Y/N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

PLANE NUMBER	1-63	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
PLANE TYPE	[5]	JILL	JUDY	PETE	OSCAR	TONY	PEGGY	BABS	VAL	ZERO 2	BETTY	MAVIS	KATE	SALLY	GRACE	JAKE
ROLE	0-2	1	1	2	0	0	1	2	1	0	1	2	1	1	1	2
CREW	0-5	2	1	1	0	0	4	1	1	0	4	5	2	3	1	2
RANGE (n,e,t)	0-31	4,8,10	4,8,9	3,4,4	2,5,7	2,2,4	5,9,11	10,10,12	6,7,9	3,5,6	12,16,18	14,24,26	8,10,11	5,8,10	5,7,8	7,13,15
ALT. (h,m,l)	0-3	1,3,3	2,3,3	2,3,3	3,3,3	3,3,3	2,3,1	3,3,3	3,3,2	3,3,2	2,3,3	2,3,2	1,3,3	2,3,3	3,3,2	1,3,3
CRUIS. SPEED	0-15	9	12	7	12	11	11	9	8	10	9	7	7	10	10	6
BOMB LOAD	0-63	6	3	1	4	0	6	0	3	2	8	8	6	8	6	2
CHAR. (f,v,m,p)	0-7	1,3,3,2	2,2,5,3	2,2,5,0	2,4,6,3	4,4,5,4	3,4,2,3	1,2,5,3	2,2,5,1	4,4,7,4	3,2,1,1	3,3,0,0	1,2,3,0	3,2,2,2	3,3,4,4	1,2,3,0
ALLIED	Y/N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
CARRIER	Y/N	Y	Y	N	N	N	N	N	Y	Y	N	N	Y	N	Y	N
SEAPLANE	Y/N	N	N	Y	N	N	N	N	N	N	N	Y	N	N	N	Y
TORPEDO	Y/N	Y	N	N	N	N	Y	N	N	N	Y	Y	Y	N	Y	N
NIGHT	Y/N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N
ANTI-SUB.	Y/N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

LEYTE GULF - Ship Classes

SHIP CLASS #	1-63	1	2	3	4	5	6	7	8	9	10	11	12	13	14
CLASS NAME	[8]	CV 1936	CV 1942	CVL1942	CVE1939	CVE1943	BB 1915	BB 1917	BB 1919	BB 1920	BB 1940	BB 1941	BB 1942	CA 1931	CA 1933
ALLIED	Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SEAPLANE	Y/N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
SHIP TYPE	0-4	0	0	0	0	0	1	1	1	1	1	1	1	1	1
MAXIMUM SPEED	0-45	33	33	32	18	19	21	22	21	21	28	28	33	33	33
DISPLACEMENT	0-31	10	14	6	20	8	13	13	16	18	18	18	23	5	5
HEAVY AA	0-31	8	12	0	4	2	16	8	16	16	20	20	20	8	8
LIGHT AA	0-31	17	24	12	8	8	10	10	16	14	20	16	28	9	9
ARMOUR	0-15	4	5	0	0	0	14	14	14	15	12	12	12	2	5
PRIMARY GUNS	0-15	0	0	0	0	0	12	12	12	8	9	9	9	9	9
SEC. GUNS	0-15	4	6	0	2	2	8	4	8	8	10	10	10	4	4
TORP. TUBES	0-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VULNERABILITY	0-7	2	2	2	1	2	4	4	5	5	6	6	7	3	4
ANTI-SUB	0-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TORP. LOADS	0-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SHIP CLASS #	1-63	15	16	17	18	19	20	21	22	23	24	25	26	27	28
CLASS NAME	[8]	CA 1937	CA 1942	CL 1936	CL 1941	CLA1941	DD 1934	DD 1935A	DD 1935B	DD 1936A	DD 1936B	DD 1938A	DD 1939	DD 1942	DE 1942
ALLIED	Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SEAPLANE	Y/N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
SHIP TYPE	0-4	1	1	2	2	2	2	2	2	2	2	2	2	2	2
MAXIMUM SPEED	0-45	33	33	33	33	33	37	37	37	39	39	39	35	35	21
DISPLACEMENT	0-31	5	7	5	6	3	1	1	1	1	1	1	1	1	0
HEAVY AA	0-31	8	12	8	12	16	4	5	4	4	4	4	4	5	2
LIGHT AA	0-31	6	15	10	9	14	3	4	2	1	2	2	3	4	2
ARMOUR	0-15	6	6	5	5	4	0	0	0	0	0	0	0	1	0
PRIMARY GUNS	0-15	9	9	0	0	0	0	0	0	0	0	0	0	0	0
SEC. GUNS	0-15	4	6	15	15	8	2	2	2	2	2	2	2	2	0
TORP. TUBES	0-15	0	0	0	0	8	0	8	12	15	15	8	10	10	0
VULNERABILITY	0-7	4	6	5	6	5	4	4	4	3	4	4	5	6	3
ANTI-SUB	0-7	0	0	0	0	0	2	1	1	2	2	3	2	3	5
TORP. LOADS	0-3	0	0	0	0	2	1	1	1	1	1	1	1	1	0

SHIP CLASS #	1-63	29	30	31	32	33	34	41	42	43	44	45	46	47	49
CLASS NAME	[8]	AGC-43M	APA-43M	AP 1942	SS 1942	CA (CW)	DD (CW)	CV 1939	CVL1935	CVE1936	BB 1915	BB-XCV	BB 1919	BB 1940A	BC 1912A
ALLIED	Y/N	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N
SEAPLANE	Y/N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y
SHIP TYPE	0-4	4	4	4	3	1	2	0	0	0	1	1	1	1	1
MAXIMUM SPEED	0-45	0	0	0	20	30	35	34	28	29	23	25	25	28	30
DISPLACEMENT	0-31	3	3	4	1	5	1	12	6	5	12	12	17	29	15
HEAVY AA	0-31	6	8	6	1	6	4	16	8	8	8	4	8	24	8
LIGHT AA	0-31	6	8	3	1	8	3	8	6	4	13	6	13	13	12
ARMOUR	0-15	0	0	0	0	6	0	9	0	0	12	12	11	15	8
PRIMARY GUNS	0-15	0	0	0	0	9	0	0	0	0	12	6	8	9	8
SEC. GUNS	0-15	1	1	2	1	4	2	8	4	0	8	4	8	12	8
TORP. TUBES	0-15	0	0	0	10	8	10	0	0	0	0	0	0	0	0
VULNERABILITY	0-7	4	4	2	5	6	5	1	5	0	2	2	2	4	3
ANTI-SUB	0-7	0	0	0	0	0	2	0	0	0	0	0	0	0	0
TORP. LOADS	0-3	0	0	0	2	2	1	0	0	0	0	0	0	0	0

SHIP CLASS #	1-63	50	51	52	53	54	55	56	57	58	59	60	61	62	63
CLASS NAME	[8]	CA 1927	CA 1930A	CA 1930B	CA 1934A	CA 1934B	CA 1937	CL 1941	DD 1935	DD 1936	DD 1938	DD 1941A	DD 1941B	DD 1942	SS 1939
ALLIED	Y/N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
SEAPLANE	Y/N	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N
SHIP TYPE	0-4	1	1	1	1	1	1	2	2	2	2	2	2	2	3
MAXIMUM SPEED	0-45	34	34	34	35	35	35	35	34	34	34	35	33	41	24
DISPLACEMENT	0-31	6	6	6	6	5	6	3	1	1	1	1	1	1	1
HEAVY AA	0-31	8	8	12	8	8	8	2	4	4	4	4	8	4	1
LIGHT AA	0-31	3	4	5	4	4	7	7	4	3	3	3	3	3	1
ARMOUR	0-15	4	5	5	6	6	6	1	0	0	0	0	0	0	0
PRIMARY GUNS	0-15	10	10	10	10	6	8	0	0	0	0	0	0	0	0
SEC. GUNS	0-15	0	0	0	4	4	4	6	2	2	2	2	0	2	1
TORP. TUBES	0-15	15	15	15	12	12	12	8	8	8	8	8	4	15	6
VULNERABILITY	0-7	3	3	3	2	1	3	3	3	5	4	4	4	3	3
ANTI-SUB	0-7	0	0	0	0	0	0	2	2	2	2	2	3	2	0
TORP. LOADS	0-3	2	2	2	2	1	2	2	1	1	2	2	2	1	3

LEYTE GULF - Other Ships

SHIP NUMBER	1-215	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PENNANT NUM.	[5]	CA 27	CA 25	CA 24	CLA95	CLA53	DD547	DD375	DD370	DD589	DD673	DD399	DD550	DD551	DD553	DD351
SHIP CLASS	1-63	13	13	13	19	19	27	22	22	27	27	25	27	27	27	20
DAM. STATUS	0-15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
CARGO	0-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RADAR	0-7	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2
DAM. CONTROL	0-3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
AA ACCURACY	0-3	2	2	2	3	3	2	2	2	2	2	2	2	2	2	2
TASK GROUP	1-23	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
SUB. PATROL	(x,y)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUB. DEPTH	0-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUB. SPEED	0-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SEAPLANE SQN	[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SHIP NUMBER	1-215	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
PENNANT NUM.	[5]	DD355	DD398	DD500	DD582	DD686	DD488	DD538	DD390	DD590	DD537	DD540	CL 62	CLA96	DD793	DD671
SHIP CLASS	1-63	20	25	27	27	27	26	27	23	27	27	27	18	19	27	27
DAM. STATUS	0-15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
CARGO	0-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RADAR	0-7	2	2	2	2	2	2	2	2	2	2	2	3	3	2	2
DAM. CONTROL	0-3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
AA ACCURACY	0-3	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2
TASK GROUP	1-23	1	1	1	2	2	2	2	2	2	2	2	3	3	3	3
SUB. PATROL	(x,y)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUB. DEPTH	0-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUB. SPEED	0-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SEAPLANE SQN	[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SHIP NUMBER	1-215	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
PENNANT NUM.	[5]	DD794	DD560	DD668	DD651	DD653	DD672	DD559	DD380	DD388	DD669	DD650	DD400	DD401	DD389	DD392
SHIP CLASS	1-63	27	27	27	27	27	27	27	24	23	27	27	24	24	23	23
DAM. STATUS	0-15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
CARGO	0-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RADAR	0-7	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
DAM. CONTROL	0-3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
AA ACCURACY	0-3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
TASK GROUP	1-23	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4
SUB. PATROL	(x,y)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUB. DEPTH	0-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUB. SPEED	0-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SEAPLANE SQN	[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SHIP NUMBER	1-215	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
PENNANT NUM.	[5]	DD683	BB 61	BB 62	CL 64	CL 89	CL 80	DD682	DD670	DD652	DD676	DD535	DD536	DD539	DD675	BB 59
SHIP CLASS	1-63	27	12	12	18	18	18	27	27	27	27	27	27	27	27	11
DAM. STATUS	0-15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
CARGO	0-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RADAR	0-7	2	6	6	3	3	3	2	2	2	2	2	2	2	2	6
DAM. CONTROL	0-3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
AA ACCURACY	0-3	2	3	3	2	2	2	2	2	2	2	2	2	2	2	3
TASK GROUP	1-23	4	5	5	5	5	5	5	5	5	5	5	5	5	5	6
SUB. PATROL	(x,y)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUB. DEPTH	0-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUB. SPEED	0-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SEAPLANE SQN	[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SHIP NUMBER	1-215	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
PENNANT NUM.	[5]	BB 56	BB 57	BB 60	DD546	DD581	DD514	DD541	CL 60	CL 63	CA 45	CA 72	DD386	DD554	DD588	DD674
SHIP CLASS	1-63	10	11	11	27	27	27	27	18	18	15	14	23	27	27	27
DAM. STATUS	0-15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
CARGO	0-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RADAR	0-7	6	6	6	2	2	2	2	3	3	3	5	2	2	2	2
DAM. CONTROL	0-3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
AA ACCURACY	0-3	3	3	3	2	2	2	2	2	2	3	3	2	2	2	2
TASK GROUP	1-23	6	6	6	6	6	6	6	7	7	7	7	7	7	7	7
SUB. PATROL	(x,y)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUB. DEPTH	0-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUB. SPEED	0-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SEAPLANE SQN	[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

LEYTE GULF - Other Ships (Cont.)

SHIP NUMBER	1-215	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
PENNANT NUM.	[5]	DD382	DD572	DD534	DD530	DD531	DE402	DE404	DD555	DD554	DD556	DE342	DE343	DE414	DE412	DD533
SHIP CLASS	1-63	24	27	27	27	27	28	28	27	27	27	28	28	28	28	27
DAM. STATUS	0-15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
CARGO	0-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RADAR	0-7	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
DAM. CONTROL	0-3	2	2	2	2	2	1	1	2	2	2	1	1	1	1	2
AA ACCURACY	0-3	2	2	2	2	2	1	1	2	2	2	1	1	1	1	2
TASK GROUP	1-23	7	7	8	8	8	8	8	9	9	9	9	9	9	9	10
SUB. PATROL	(x,y)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUB. DEPTH	0-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUB. SPEED	0-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SEAPLANE SQN	[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SHIP NUMBER	1-215	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105
PENNANT NUM.	[5]	DD532	DD557	DE405	DE339	DE341	DE413	BB 41	BB 46	BB 48	BB 43	BB 44	BB 38	DD569	DD508	DD643
SHIP CLASS	1-63	27	27	28	28	28	28	6	7	7	6	6	6	27	27	27
DAM. STATUS	0-15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
CARGO	0-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RADAR	0-7	2	2	2	2	2	2	4	4	4	4	4	4	2	2	2
DAM. CONTROL	0-3	2	2	1	1	1	1	2	2	2	2	2	2	2	2	2
AA ACCURACY	0-3	2	2	1	1	1	1	2	2	2	2	2	2	2	2	2
TASK GROUP	1-23	10	10	10	10	10	10	11	11	11	11	11	11	11	11	11
SUB. PATROL	(x,y)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUB. DEPTH	0-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUB. SPEED	0-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SEAPLANE SQN	[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SHIP NUMBER	1-215	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
PENNANT NUM.	[5]	DD571	DD647	DD628	CA 28	CA 33	CA 36	CL 58	CL 56	DD586	DD481	DD662	DD663	DD208	DD664	DD562
SHIP CLASS	1-63	27	27	27	13	14	14	18	18	27	27	27	27	20	27	27
DAM. STATUS	0-15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
CARGO	0-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RADAR	0-7	2	2	2	3	5	5	3	3	2	2	2	2	2	2	2
DAM. CONTROL	0-3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
AA ACCURACY	0-3	2	2	2	2	3	3	2	2	2	2	2	2	2	2	2
TASK GROUP	1-23	11	11	11	12	12	12	12	12	12	12	12	12	12	12	12
SUB. PATROL	(x,y)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUB. DEPTH	0-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUB. SPEED	0-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SEAPLANE SQN	[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SHIP NUMBER	1-215	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135
PENNANT NUM.	[5]	DD649	DD665	DD480	CL 46	CL 47	CA 73	DD476	DD470	DD519	DD471	DD A1	AGC 9	APA 1	APA 2	APA 3
SHIP CLASS	1-63	27	27	27	17	17	33	27	27	27	27	34	29	30	30	30
DAM. STATUS	0-15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
CARGO	0-15	0	0	0	0	0	0	0	0	0	0	0	6	6	6	6
RADAR	0-7	2	2	2	3	3	6	2	2	2	2	2	6	0	0	0
DAM. CONTROL	0-3	2	2	2	2	2	3	2	2	2	2	3	2	2	2	2
AA ACCURACY	0-3	2	2	2	2	2	3	2	2	2	2	3	3	3	3	3
TASK GROUP	1-23	12	12	12	13	13	13	13	13	13	13	13	13	13	13	13
SUB. PATROL	(x,y)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUB. DEPTH	0-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUB. SPEED	0-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SEAPLANE SQN	[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SHIP NUMBER	1-215	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
PENNANT NUM.	[5]	APA 4	APA 5	APA 6	APA 7	APA 8	AP 1	AP 2	AP 3	AP 4	AP 5	AP 6	AP 7	AP 8	SS 1	SS 2
SHIP CLASS	1-63	30	30	30	30	30	31	31	31	31	31	31	31	31	32	32
DAM. STATUS	0-15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
CARGO	0-15	6	6	6	6	6	6	6	6	6	6	6	6	6	0	0
RADAR	0-7	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
DAM. CONTROL	0-3	2	2	2	2	2	1	1	1	1	1	1	1	1	2	2
AA ACCURACY	0-3	3	3	3	3	3	2	2	2	2	2	2	2	2	1	1
TASK GROUP	1-23	13	13	13	13	13	13	13	13	13	13	13	13	13	-	-
SUB. PATROL	(x,y)	-	-	-	-	-	-	-	-	-	-	-	-	-	16,43	13,43
SUB. DEPTH	0-7	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3
SUB. SPEED	0-7	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3
SEAPLANE SQN	[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

LEYTE GULF - Other Ships (Cont.)

SHIP NUMBER	1-215	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165
PENNANT NUM.	[5]	SS 3	SS 1	SS 2	CL 7	CL 9	DD153	DD154	DD155	DD161	BB 4	BB 3	CL 25	DD131	DD135	DD142
SHIP CLASS	1-63	32	63	63	56	56	62	62	62	62	45	45	56	61	61	61
DAM. STATUS	0-15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
CARGO	0-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RADAR	0-7	3	0	0	1	1	1	1	1	1	2	2	1	1	1	1
DAM. CONTROL	0-3	2	0	0	2	2	1	1	1	1	2	2	2	1	1	1
AA ACCURACY	0-3	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1
TASK GROUP	1-23	-	-	-	1	1	1	1	1	1	2	2	2	2	2	2
SUB. PATROL	(x,y)	13,43	28,58	19,61	-	-	-	-	-	-	-	-	-	-	-	-
SUB. DEPTH	0-7	3	4	4	-	-	-	-	-	-	-	-	-	-	-	-
SUB. SPEED	0-7	3	2	2	-	-	-	-	-	-	-	-	-	-	-	-
SEAPLANE SQN	[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SHIP NUMBER	1-215	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
PENNANT NUM.	[5]	DD145	BB 8	BB 7	BB 6	CA 9	CA 12	CA 10	CA 11	CA 7	CA 6	DD104	DD105	DD106	DD107	DD109
SHIP CLASS	1-63	61	47	47	46	51	51	51	51	50	50	60	60	60	60	60
DAM. STATUS	0-15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
CARGO	0-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RADAR	0-7	1	2	2	2	2	2	2	2	2	2	1	1	1	1	1
DAM. CONTROL	0-3	1	2	2	2	2	2	2	2	2	2	1	1	1	1	2
AA ACCURACY	0-3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
TASK GROUP	1-23	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3
SUB. PATROL	(x,y)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUB. DEPTH	0-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUB. SPEED	0-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SEAPLANE SQN	[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SHIP NUMBER	1-215	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195
PENNANT NUM.	[5]	DD114	DD119	DD120	DD147	CL 22	BC 4	BC 1	CA 13	CA 16	CA 17	CA 18	CL 24	DD 88	DD 91	DD 96
SHIP CLASS	1-63	60	60	60	61	56	49	49	53	53	55	55	56	58	58	58
DAM. STATUS	0-15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
CARGO	0-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RADAR	0-7	1	1	1	1	1	2	2	2	2	2	2	2	1	1	2
DAM. CONTROL	0-3	1	1	1	1	2	2	2	2	2	2	2	2	1	1	1
AA ACCURACY	0-3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
TASK GROUP	1-23	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4
SUB. PATROL	(x,y)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUB. DEPTH	0-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUB. SPEED	0-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SEAPLANE SQN	[1]	-	-	-	-	-	-	-	-	-	67	68	-	-	-	-

SHIP NUMBER	1-215	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210
PENNANT NUM.	[5]	DD101	DD102	DD115	BB 2	BB 1	CA 15	DD 69	DD 77	DD 80	DD 84	CA 8	CA 5	CL 8	DD 32	DD 52
SHIP CLASS	1-63	58	58	59	44	44	53	57	57	57	57	50	50	56	57	57
DAM. STATUS	0-15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
CARGO	0-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RADAR	0-7	1	1	1	2	2	2	1	1	1	1	2	2	1	1	1
DAM. CONTROL	0-3	1	1	1	2	2	2	1	1	1	1	2	2	2	1	1
AA ACCURACY	0-3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
TASK GROUP	1-23	4	4	4	5	5	5	5	5	5	5	6	6	6	6	6
SUB. PATROL	(x,y)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUB. DEPTH	0-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUB. SPEED	0-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SEAPLANE SQN	[1]	-	-	-	-	-	126	-	-	-	-	-	-	-	-	-

SHIP NUMBER	1-215	211	212	213	214	215
PENNANT NUM.	[5]	DD 60	DD 61	DD 63	DD 79	DD 98
SHIP CLASS	1-63	57	57	57	58	58
DAM. STATUS	0-15	15	15	15	15	15
CARGO	0-15	0	0	0	0	0
RADAR	0-7	1	1	1	1	1
DAM. CONTROL	0-3	1	1	1	1	1
AA ACCURACY	0-3	1	1	1	1	1
TASK GROUP	1-23	6	6	6	6	6
SUB. PATROL	(x,y)	-	-	-	-	-
SUB. DEPTH	0-7	-	-	-	-	-
SUB. SPEED	0-7	-	-	-	-	-
SEAPLANE SQN	[1]	-	-	-	-	-

LEYTE GULF - Names

AXIS THEATRE 0	FUKUDOME
AXIS THEATRE 1	KAKUTA
AXIS TASK FORCE 0	OZAWA
AXIS TASK FORCE 1	KURITA
AXIS TASK FORCE 2	NISHIMURA
AXIS TASK FORCE 3	SHIMA

ALLIED THEATRE 0	KENNEY
ALLIED THEATRE 1	-
ALLIED TASK FORCE 0	HALSEY
ALLIED TASK FORCE 1	KINKAID
ALLIED TASK FORCE 2	-
ALLIED TASK FORCE 3	-

Continued from p.10

pay any price to destroy the Allied invasion. Therefore, the victory conditions allow a Japanese victory, regardless of the Allied score. The requirement to sink or remove a specific number of auxiliary ships represents the impact on the Allied invasion forces. To win, the Allies must inflict a significant quantity of damage on the Japanese, but this must be accomplished without incurring excessive losses.

VICTORY

Allied Decisive - 500 points more than the Japanese, less than 5 Allied auxiliaries (in TG 13) sunk or removed, AND none of the Japanese victory conditions are accomplished.

Allied Major - 500 points more than the Japanese AND none of the Japanese victory conditions are accomplished.

Allied Minor - More points than the Japanese and none of the Japanese victory conditions are accomplished.

Note. An Allied Minor Victory approximates the historical outcome and should be considered a draw for game purposes.

Japanese Minor - More points than Allied.

Japanese Major - 500 points (regardless of Allied score) **or** at least 8 Allied auxiliaries (in TG 13) sunk or removed.

Japanese Decisive - 500 points (regardless of Allied score) **and** at least 8 Allied auxiliaries (in TG 13) sunk or removed.

The following interpretations apply to the victory conditions.

Minor Victory - No significant change has occurred in the course of the war, either in strategy or in the ultimate timing of the war's completion.

Major Victory - The course of the war has been greatly altered. An Allied victory leads to a quicker end to the war as the schedule of future invasions is accelerated, while a Japanese victory forces significant delays in the Allied plans.

Decisive Victory - The course of the war has not only been greatly altered, but political repercussions force major changes in the conduct of the war. An Allied victory results in a more moderate Japanese government coming to power, and taking a serious look at ending the war. A Japanese victory results in major shakeups in the Allied leadership in the Pacific theatre as the end of the war appears further away than ever.

SOME VARIATIONS

1. Joint Command. Historically, both sides consisted of split commands, so opportunities were missed and major disasters occurred. Had forces been combined, victory could have been greater, or losses less disastrous. Combine all task groups into fewer task forces on one or both sides.

2. Trained Aircrews. The Japanese were desperately short of quality pilots, due to combat losses and inadequate time to train replacements. If the invasion had been a few months later, or the Japanese had established a better training program, aircrews could have been more completely trained. Upgrade the combat experience of all Japanese squadrons by 1 or more levels.

3. More Aircraft. In the weeks preceding the battle, the Japanese suffered tremendous losses in aircraft, so the forces available to counter the invasion were woefully inadequate. Assume the Japanese had been more careful in committing their air power. Double or triple the strength of all combat (fighter and bomber) squadrons assigned to bases in the Philippines - Tuguegrao, Clark Field, Manila, Legaspi, Bacolod, Butuan, Malaybalay and Davao.

SOME NOTES

1. Reinforcements. All the Japanese naval forces, and one of the Allied task groups, in this scenario begin the game as reinforcements. Remember that there is no control over these groups until they enter the map.

2. Creating the Weather. Weather forecasts are provided for each of the twelve sectors. Enter these via Menu 14 then go to Menu 13. Type (RET) five times to get the weather report routines up and running, then save the result as the Weather Report.

3. Prohibited Hexes and Blocked Hex-Sides. A number of hexes must be designated as prohibited (terrain type T1) to prevent problems with naval force movement routines.

These hexes are 14:66 23:25 31:34 32:55 36:35 41:43 16:64 23:26 32:35 34:34 40:43 43:48 22:26 24:31 32:47 35:52 41:41 44:59

Two hex-sides are blocked because these channels were not navigable by naval forces in a combat situation. Blocking the hex-side prevents movement that would not have ocurred historically.

These hex-sides are: 40:43/41:43 42:48/43:48

4. Clearing Map Points. This is just a reminder to type (Y) on the <CLEAR MAP POINTS> line. Otherwise, every coast-watcher will end up in hex location 0:0. Coastwatchers represent Allied guerilla forces and Japanese ground forces that might have observed enemy naval movements and relayed sighting reports.

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Hoyt, Edwin P., **The Battle of Leyte Gulf**, Pinnacle Books, 1972.

Macintyre, Donald, **Leyte Gulf: Armada in the Pacific**. Ballantine Books, 1969.

Morison, Samuel Eliot, **History of United States Naval Operations in World War II; Volume XII: Leyte**. Little, Brown and Company, 1984. ◆

EDITOR'S NOTE

This scenario, designed by Kenneth G. Wastrack of Muscle Shoals, Alabama, was the winner of our *Carriers at War* design competition. Ken also wrote the historical notes accompanying the scenario.

PROGRAMMING AND GAME DESIGN

By Roger Keating and His Computer

Before you start a strategy game you have to decide on how the game is going to be displayed to the players. In almost all cases a grid system has to be developed that will do three things: regulate movement, allow for the easy resolution of combat and give the computer's intelligence something to bite (sic) on.

The method that I have used in all games to date is the hex grid system, a system that has been used in traditional board wargames for the last 25 years.

A NOTE ON NUMBERS

A small note before starting. Any number which is intended to be read as a decimal will have an exclamation mark in front of it (i.e. !10 means decimal ten). Machine language programmers use the exclamation mark to denote surprise at the fact that people still use this system! A hexadecimal number has a dollar sign attached (i.e. $10 = !16). This is to indicate the vain hope of the programmer that he will be paid!

The hexgrid has several advantages over other grid forms, such as having 6 sides and 6 adjacent hexes to play with; i.e. you can move in 6 different directions. Unfortunately computers do not have the ability to display this type of grid easily but that is another story.

My problem has been to get this hex grid into a small amount of memory and build routines to access it rapidly. To demonstrate this process I will use the grid system from ***Battlefront.***

THE BASIC HEX

Battlefront uses a map size of !39 hexes across and !28 down. Through the creation routines it is possible to choose a smaller portion of this basic size to allow smaller battles to be fought out. For this purpose the map has been divided into 12 segments, 3 across and four down. The variables MAXX and MAXY are set to the maximum number of columns and rows respectively. The map system is labelled as shown in diagram 1a.

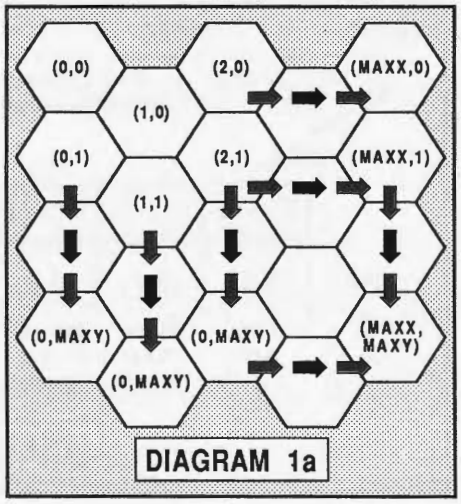


DIAGRAM 1a

The values of MAXX and MAXY can be decided by reference to diagram 1b.

	0 (!12)	1 (!25)	2 (!38)
0 (!6)			
1 (!13)			
2 (!20)			
3 (!27)			

DIAGRAM 1b

The Stalingrad scenario in ***Battlefront*** uses 1 screen across by 2 down therefore MAXX = !12 and MAXY = !13.

This means that !39 * !28 (!1092) hexes are going to be stored in the ***Battlefront*** map database. I will use the co-ordinates (XC,YC) to mean the central hex that is being discussed and the directions 1 to 6 will be used to address the six adjacent hexes. See diagram 2a.

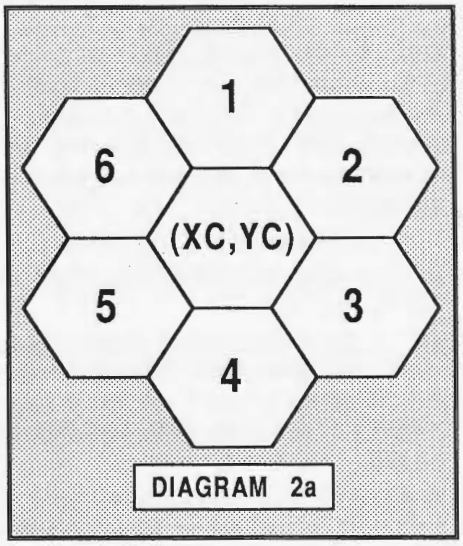


DIAGRAM 2a

The variables that will have to be stored for the central hex and its 6 adjacent hexes are identified in diagram 2b.

Thus -

C0 = color of the central hex

C1 - C6 = type of sides surrounding the central hex

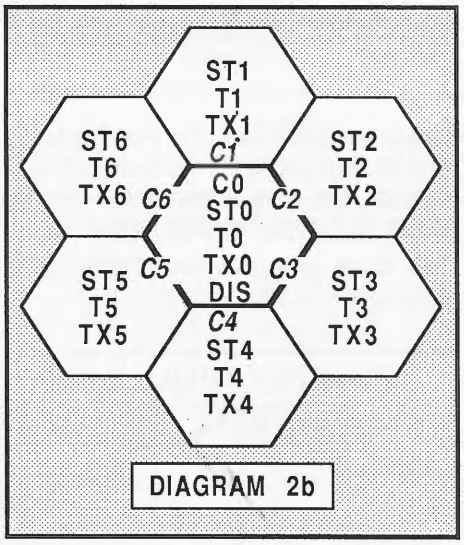


DIAGRAM 2b

ST0 - ST6 = flags to identify features in the hex

T0 - T6 = natural terrain of hex

TX0 - TX6 = shape that 'occupies' the hex

DIS = flags to indicate if central hex is objective for either side.

SETTING UP THE TERRAIN TABLE

To fit the data for the !1092 hexes into the APPLE II or C64 with their limited memory capabilities it was necessary to try to limit the number of bytes allocated to each hex. After much discussion about the size of each of the above variables it was decided to allocate 3 bytes to each hex in the map for a total of !3276 bytes. The variables are arranged in each of the 3 bytes as shown in diagram 3a.

Thus, for the town of BASTOGNE, the data in the 3 bytes would appear as shown in diagram 3b.

BASTOGNE is a town with a road through it and is under Allied control. Side 3 is a bridge and the natural terrain in the hex is clear (terrain #1). Both sides have objectives in this hex.

Note that C0 is not needed as the color of the central shape can be found from the terrain and C4, C5 and C6 can be found by looking at the C1, C2 and C3 values of the surrounding hexes as shown in diagram 3c.

Having decided to use 3 bytes per hex, it was a simple matter to allocate memory to it and devise a small subroutine (called ADDRESS) to access it. See diagram 4.

The map has been allocated to memory between $4000 and $4CCB. The space

DIAGRAM 3a

	ST0						C1	
0	C	R	F	M	A	E		

	T0				C3		C2	
1								

	TX0						DIS	
2							AL	AX

T0 (terrain)

0 - Ocean	8 - Airfield
1 - Clear	9 - Shape 1
2 - Woods	A - Shape 2
3 - Rough	B - Shape 3
4 - Jungle	C - Shape 4
5 - Mountain	D - Shape 5
6 - Swamp	E - Shape 6
7 - Desert	F - Shape 7

ST0 (flags)

C - City
R - Road
F - Fort
M - Mine
A - Allied
E - Exposed Mine

C1-C3 (sides)

0 - Null
1 - River
2 - Bridge

DIS

AL - Allied Obj.
AX - Axis Obj.

TX0 indicates the unit shape to be displayed; for example an Allied landing craft is $15, a mechanized infantry unit is $22. There are !55 different shapes.

occupied by the hex (1,2) can be found by looking at column 2 (the hex grid is numbered from 0 so that XC = 1 indicates the 2nd column) which starts at $4054 and advancing 2 hexes (or 6 bytes) along, thus (1,2) occupies the 3 bytes $405A through $405C.

DIAGRAM 3b

0	1	1	0	0	1	0	0	0
1	0	0	0	1	1	0	0	0
2	0	0	0	0	0	0	1	1

The data for the town of Bastogne.

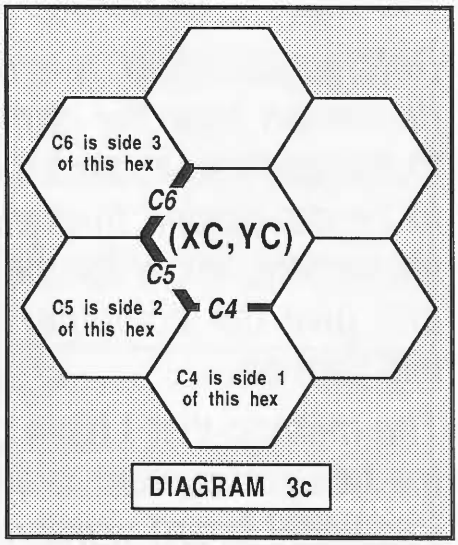


DIAGRAM 3c

SETTING UP THE INDEXES

To save the computer having to perform calculations for each hexside of an adjacent hex it is preferable to set up index tables

Continued on p.22

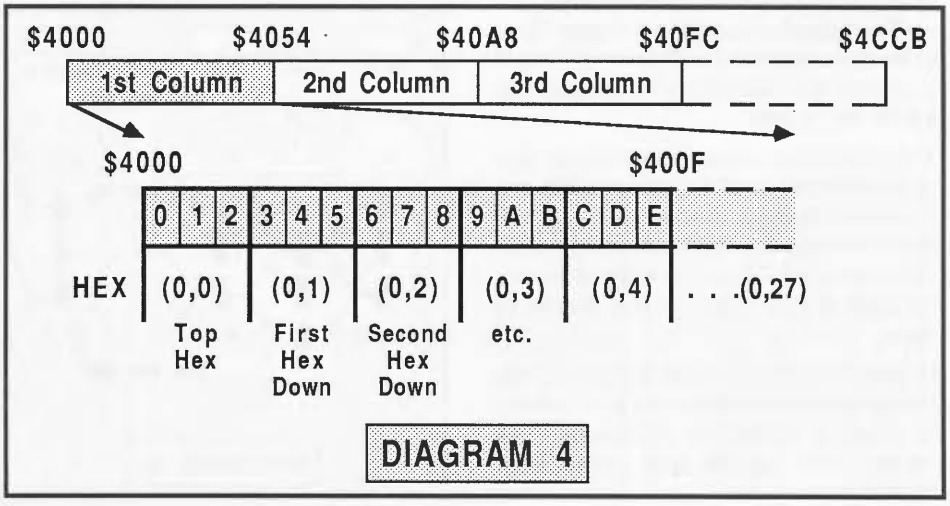


DIAGRAM 4

```
0800                 1 ;
0800                 2 ;
0800                 3 ;
0800                 4 ;HEX MAP SUBROUTINES
0800                 5 ;
0800                 6 ;
0800                 7 ;
0800 4C 54 08        8         jmp ADDRESS
0803 4C 94 08        9         jmp BREAKHEX
0806                10 ;
0806                11 ;zero page variables
0806                12 ;
0002                13 ML     epz $2
0003                14 MH     epz $3
0004                15 AL     epz $4
0005                16 AH     epz $5
0806                17 ;
0806                18 ;page $300 variables
0806                19 ;
0300                20 XC     =   $300
0301                21 YC     =   XC+$1
0806                22 ;
0302                23 ST0    =   XC+$2
0303                24 ST1    =   XC+$3
0304                25 ST2    =   XC+$4
0305                26 ST3    =   XC+$5
0306                27 ST4    =   XC+$6
0307                28 ST5    =   XC+$7
0308                29 ST6    =   XC+$8
0806                30 ;
0309                31 C0     =   XC+$9
030A                32 C1     =   XC+$A
030B                33 C2     =   XC+$B
030C                34 C3     =   XC+$C
030D                35 C4     =   XC+$D
030E                36 C5     =   XC+$E
030F                37 C6     =   XC+$F
0806                38 ;
0310                39 T0     =   XC+$10
0311                40 T1     =   XC+$11
0312                41 T2     =   XC+$12
0313                42 T3     =   XC+$13
0314                43 T4     =   XC+$14
0315                44 T5     =   XC+$15
0316                45 T6     =   XC+$16
0806                46 ;
0317                47 TX0    =   XC+$17
0318                48 TX1    =   XC+$18
0319                49 TX2    =   XC+$19
031A                50 TX3    =   XC+$1A
031B                51 TX4    =   XC+$1B
031C                52 TX5    =   XC+$1C
031D                53 TX6    =   XC+$1D
0806                54 ;
031E                55 SHAPE  =   XC+$1E
031F                56 DIS    =   XC+$1F
0320                57 MAXX   =   XC+$20
```

```
0321                58 MAXY   =   XC+$21
0322                59 TURN   =   XC+$22
0806                60 ;
0806                61 ;multiple table of $54 to
0806                62 ;speed up calculations
0806                63 ;
0806 00 54 A8       64 XCL    hex 0054A8FC50
0809 FC 50 A4                     A4F84CA0F4
080C F8 4C A0
080F F4
0810 48 9C F0       65        hex 489CF04498
0813 44 98 EC                     EC4094E83C
0816 40 94 E8
0819 3C
081A 90 E4 38       66        hex 90E4388CE0
081D 8C E0 34                     3488DC3084
0820 88 DC 30
0823 84
0824 D8 2C 80       67        hex D82C80D428
0827 D4 28 7C                     7CD02478
082A D0 24 78
082D                68 ;
082D 40 40 40       69 XCH    hex 4040404041
0830 40 41 41                     4141424242
0833 41 42 42
0836 42
0837 43 43 43       70        hex 4343434444
083A 44 44 44                     4445454546
083D 45 45 45
0840 46
0841 46 46 47       71        hex 4646474747
0844 47 47 48                     4848484949
0847 48 48 49
084A 49
084B 49 4A 4A       72        hex 494A4A4A4B
084E 4A 4B 4B                     4B4B4C4C
0851 4B 4C 4C
0854                73 ;
0854                74 ;calculate address (XC,YC)
0854                75 ;by $54*XC+3*YC and place
0854                76 ;so it can be addressed via
0854                77 ;lda (ML),y where y=0,1 or 2
0854                78 ;
0854                79 ADDRESS:
0854 AE 00 03       80          ldx XC
0857 BD 2D 08       81          lda XCH,X
085A 85 03          82          sta MH
085C                83 ;
085C AD 01 03       84          lda YC
085F 0A             85          asl
0860 6D 01 03       86          adc YC
0863 7D 06 08       87          adc XCL,X
0866 90 02          88          bcc >2
0868 E6 03          89          inc MH
086A 85 02          90 ^2       sta ML
086C 60             91          rts
086D                92 ;
```

```
086D             93 ;index to the six sur-
086D             94 ;rounding hexes
086D             95 ;
086D             96 HEXIND:
086D             97 ;even:top
086D 00 00 AE    98          hex 0000AE
0870 5D 06 00               5D0600
0873             99 ;middle
0873 57 AB AE   100          hex 57ABAE
0876 5D 06 03               5D0603
0879            101 ;bottom
0879 57 AB AE   102          hex 57ABAE
087C 00 06 03               000603
087F            103 ;
087F            104 ;odd:top
087F 00 AE B1   105          hex 00AEB1
0882 5D 09 06               5D0906
0885            106 ;middle
0885 57 AE B1   107          hex 57AEB1
0888 5D 09 06               5D0906
088B            108 ;bottom
088B 57 AE 00   109          hex 57AE00
088E 00 00 06               000006
0891            110 ;
0891 1A         111 MINE     hex 1A
0892 10         112 CITY     hex 10
0893 00         113 ROADFLG  hex 00
0894            114 ;
0894            115 BREAKHEX:
0894 20 54 08   116          jsr ADDRESS
0897            117 ;
0897            118 ;clear all hex variables
0897            119 ;
0897 A9 00      120          lda 00
0899 A2 06      121          ldx 06
089B 9D 09 03   122 ^1       sta C0,X
089E 9D 17 03   123          sta TX0,X
08A1 9D 10 03   124          sta T0,X
08A4 9D 02 03   125          sta ST0,X
08A7 CA         126          dex
08A8 10 F1      127          bpl <1
08AA            128 ;
08AA            129 ;data from central hex
08AA            130 ;
08AA A0 00      131          ldy 00
08AC B1 02      132          lda (ML),Y
08AE 4A         133          lsr
08AF 4A         134          lsr
08B0 8D 02 03   135          sta ST0
08B3            136 ;
08B3 B1 02      137          lda (ML),Y
08B5 29 03      138          and 03
08B7 8D 0A 03   139          sta C1
08BA            140 ;
08BA C8         141          iny
08BB B1 02      142          lda (ML),Y
08BD 29 03      143          and 03
```

```
08BF 8D 0B 03   144          sta C2
08C2 B1 02      145          lda (ML),Y
08C4 4A         146          lsr
08C5 4A         147          lsr
08C6 29 03      148          and 03
08C8 8D 0C 03   149          sta C3
08CB B1 02      150          lda (ML),Y
08CD 4A         151          lsr
08CE 4A         152          lsr
08CF 4A         153          lsr
08D0 4A         154          lsr
08D1 8D 10 03   155          sta T0
08D4 8D 1E 03   156          sta SHAPE
08D7            157 ;
08D7 C8         158          iny
08D8 B1 02      159          lda (ML),Y
08DA 29 03      160          and 03
08DC 8D 1F 03   161          sta DIS
08DF B1 02      162          lda (ML),Y
08E1 4A         163          lsr
08E2 4A         164          lsr
08E3 8D 17 03   165          sta TX0
08E6            166 ;
08E6            167 ;and get data from
08E6            168 ;surrounding hexes
08E6            169 ;
08E6 A5 02      170          lda ML
08E8 38         171          sec
08E9 E9 5A      172          sbc 5A
08EB 85 04      173          sta AL
08ED            174 ;
08ED A5 03      175          lda MH
08EF E9 00      176          sbc 00
08F1 85 05      177          sta AH
08F3            178 ;
08F3 AD 00 03   179          lda XC
08F6 4A         180          lsr
08F7 B0 14      181          bcs >4
08F9            182 ;EVEN
08F9 A2 06      183          ldx 06
08FB AD 01 03   184          lda YC
08FE D0 04      185          bne >2
0900            186 ;
0900 A2 00      187          ldx 00
0902 F0 1B      188          beq >8
0904 CD 21 03   189 ^2       cmpMAXY
0907 D0 16      190          bne >8
0909 A2 0C      191          ldx 0C
090B D0 12      192          bne >8
090D            193 ;ODD
090D A2 18      194 ^4       ldx 18
090F            195 ;
090F AD 01 03   196          lda YC
0912 D0 04      197          bne >2
0914 A2 12      198          ldx 12
0916 D0 07      199          bne >8
0918 CD 21 03   200 ^2       cmpMAXY
```

```
091B D0 02     201          bne >8
091D A2 1E     202          ldx 1E
091F 8A        203 ^8       txa
0920 18        204          clc
0921 69 6D     205          adc #HEXIND
0923 8D 30 09  206          sta HTBLA+$1
0926           207 ;
0926 A9 08     208          lda /HEXIND
0928 69 00     209          adc 00
092A 8D 31 09  210          sta HTBLA+$2
092D           211 ;
092D A2 05     212          ldx 05
092F           213 HTBLA:
092F BC 6D 08  214          ldy HEXIND,X
0932 D0 0F     215          bne >2
0934           216 ;
0934 A9 00     217          lda 00
0936 9D 03 03  218          sta ST1,X
0939 A9 FF     219          lda 0FF
093B 9D 11 03  220          sta T1,X
093E 9D 18 03  221          sta TX1,X
0941 D0 3A     222          bne >4
0943           223 ^2:
0943 B1 04     224          lda (AL),Y
0945 4A        225          lsr
0946 4A        226          lsr
0947 9D 03 03  227          sta ST1,X
094A           228 ;
094A C8        229          iny
094B B1 04     230          lda (AL),Y
094D 4A        231          lsr
094E 4A        232          lsr
094F 4A        233          lsr
0950 4A        234          lsr
0951 9D 11 03  235          sta T1,X
0954           236 ;
0954 C8        237          iny
0955 B1 04     238          lda (AL),Y
0957 4A        239          lsr
0958 4A        240          lsr
0959 9D 18 03  241          sta TX1,X
095C           242 ;and sides
095C E0 03     243          cpx 03
095E 90 1D     244          blt >4
0960 D0 07     245          bne >2
0962           246 ;side 4
0962 88        247          dey
0963 88        248          dey
0964 B1 04     249          lda (AL),Y
0966 4C 78 09  250          jmp >6
0969           251 ;
0969 E0 04     252 ^2       cpx 04
096B D0 06     253          bne >2
096D           254 ;side 5
096D 88        255          dey
096E B1 04     256          lda (AL),Y
0970 4C 78 09  257          jmp >6
```

```
0973           258 ^2:
0973           259 ;side 6
0973 88        260          dey
0974 B1 04     261          lda (AL),Y
0976 4A        262          lsr
0977 4A        263          lsr
0978 29 03     264 ^6       and 03
097A 9D 0A 03  265          sta C1,X
097D           266 ;
097D CA        267 ^4       dex
097E 10 AF     268          bpl HTBLA
0980           269 ;side of map
0980 AD 00 03  270          lda XC
0983 D0 18     271          bne >2
0985           272 ;
0985           273 ;left hand side of map
0985           274 ;
0985 A9 00     275          lda 00
0987 8D 07 03  276          sta ST5
098A 8D 08 03  277          sta ST6
098D           278 ;
098D A9 FF     279          lda 0FF
098F 8D 15 03  280          sta T5
0992 8D 16 03  281          sta T6
0995 8D 1C 03  282          sta TX5
0998 8D 1D 03  283          sta TX6
099B D0 1B     284          bne >8
099D           285 ;
099D CD 20 03  286 ^2       cmpMAXX
09A0 D0 16     287          bne >8
09A2           288 ;
09A2           289 ;right hand side of map
09A2           290 ;
09A2 A9 00     291          lda 00
09A4 8D 04 03  292          sta ST2
09A7 8D 05 03  293          sta ST3
09AA A9 FF     294          lda 0FF
09AC 8D 12 03  295          sta T2
09AF 8D 13 03  296          sta T3
09B2 8D 19 03  297          sta TX2
09B5 8D 1A 03  298          sta TX3
09B8           299 ^8:
09B8           300 ;put in coast hexsides
09B8           301 ;
09B8 A2 06     302          ldx 06
09BA BD 10 03  303 ^0       lda T0,X
09BD 10 04     304          bpl >2
09BF           305 ;edge of map
09BF A9 05     306          lda 05
09C1 D0 12     307          bne >6
09C3           308 ^2:
09C3           309 ;ocean or not
09C3 F0 09     310          beq >2
09C5           311 ;land
09C5 AD 10 03  312          lda T0
09C8 D0 0E     313          bne >8
09CA           314 ;coast
```

```
09CA A9 06     315 ^3        lda 06
09CC D0 07     316           bne >6
09CE           317 ^2:
09CE           318 ;sea
09CE AD 10 03  319           lda T0
09D1 F0 05     320           beq >8
09D3           321 ;coast
09D3 A9 06     322           lda 06
09D5           323 ^6:
09D5 9D 09 03  324           sta C0,X
09D8           325 ;
09D8 CA        326 ^8        dex
09D9 D0 DF     327           bne <0
09DB           328 ;
09DB           329 ;flag for roads and forts
09DB           330 ;
09DB AD 02 03  331           lda ST0
09DE 29 18     332           and 18
09E0 8D 93 08  333           sta ROADFLG
09E3           334 ;
09E3           335 ;place mine, city on map
09E3           336 ;
09E3 AE 91 08  337           ldx MINE
09E6 AD 02 03  338           lda ST0
09E9 29 02     339           and 02
09EB F0 01     340           beq >2
09ED E8        341           inx
```

```
09EE AD 02 03  342 ^2        lda ST0
09F1 29 05     343           and 05
09F3 F0 0C     344           beq >4
09F5           345 ;exposed
09F5 29 01     346           and 01
09F7 D0 05     347           bne >2
09F9           348 ;or turn 0
09F9 AD 22 03  349           lda TURN
09FC D0 03     350           bne >4
09FE 8E 1E 03  351 ^2        stx SHAPE
0A01           352 ;or a city
0A01 AE 92 08  353 ^4        ldx CITY
0A04 AD 02 03  354           lda ST0
0A07 29 20     355           and 20
0A09 F0 03     356           beq >8
0A0B 8E 1E 03  357           stx SHAPE
0A0E           358 ^8:
0A0E           359 ;
0A0E           360 ;if TX0>0, then display
0A0E AD 17 03  361           lda TX0
0A11 F0 03     362           beq >9
0A13 8D 1E 03  363           sta SHAPE
0A16           364 ^9:
0A16 60        365           rts
0A17           366 ;
0A17           367           end
     ***** END OF ASSEMBLY
```

Continued from p.18

that will allow the computer to look at each in turn but use the same subroutine. This table can be set up by looking at the relative position of each adjacent hex compared to the central hex. See diagram 5a.

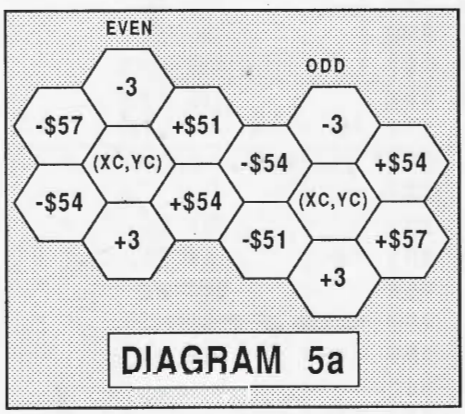


DIAGRAM 5a

It can be seen from diagram 5a that two index tables will be required depending on whether the XC value is even or odd. This is due to the way in which a row of hexes is drawn across a map. By moving 3 bytes back or forward the hexes in direction 1 and 4 can be examined and as each column is !28 hexes long and each hex occupies 3 bytes it takes !28 * 3 or !84 bytes ($54) to get to the hex in the next row.

It is hard to have a simple index table with both positive and negative numbers in it so I decided to reference all the hexes from a point 1 column back and 2 hexes up from the central hex as shown in diagram 5b.

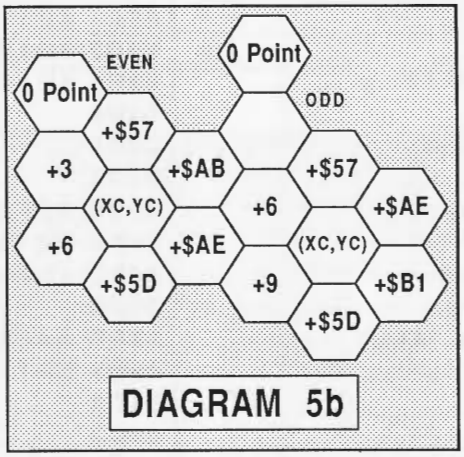


DIAGRAM 5b

To get to the new reference point I only have to subtract $5A from the (XC,YC) position and from there I can then index each adjacent hex. For an even hex the table would be - Direction 1 (add $57), Dir 2 (add $AB), Dir 3 (add $AE), Dir 4 (add $5D), Dir 5 ($06), Dir 6 (add $03).

This is tabulated in the subroutine BREAKHEX and called HEXIND. In HEXIND, there are in fact two additional indexes. They are used when the hex (XC, YC) is in the top row or the bottom row. They allow the computer to know when the adjacent hexes are outside the map. If an even hex is in the top row then hexes in directions 1,2 and 6 are off the map and if in the bottom hex row then direction 4 will be off the map.

For the top row -

Direction 1 (-), Dir 2 (-), Dir 3 (add $AE), Dir 4 (add $5D), Dir 5 ($06), Dir 6 (-).

For the bottom row -

Direction 1 (add $57), Dir 2 (add $AB), Dir 3 (add $AE), Dir 4 (-), Dir 5 ($06), Dir 6 (add $03).

THE CODING

ADDRESS and BREAKHEX are the subroutines that locate a hex in memory and reassemble the data into a usable form. They

Continued on p.48

ARNHEM

"Their's But to Do and Die. . ."
17th - 20th September, 1944

A SCENARIO FOR
BATTLEFRONT

By Gregor Whiley

Planning for Operation Market-Garden started on the 10th of September, 1944 when Field Marshall Montgomery received Eisenhower's permission for a daring air and ground operation to seize a bridgehead over the Rhine. One week later, the most ambitious Allied airborne operation of the war began. Within a further week, it was a total failure. The British 1st Airborne Division was virtually destroyed by the remnants of two SS Panzer divisions (in the area for refit) and the Rhine crossing at Arnhem remained in German hands. It was to do so until April 1945.

THE SITUATION

As the Germans retreated in disorder through France it seemed that nothing could stop an early end to the war. In fact, the Germans were retreating faster than the Allies could advance. The Channel ports had been bypassed in the headlong advance and were still held by their garrisons. All supplies for the Allies still came by truck from the Normandy beach-head.

In the inevitable supply shortages that followed, it seemed that the only barrier to further advance was logistical. The greatest enemy for a commander was not the Germans but other Allied commanders, all grabbing for a share of the supply cake.

Montgomery, now in command of the 21st Army Group fighting in the north favoured, as did the British generally, a single concentrated thrust at the Germans, the 'narrow front'. He, of course, would do the advancing. Eisenhower and the rest of the Americans favoured a continual advance on a 'broad front'.

This fundamental conflict of ideas continued throughout the operations on the Western Front. Moreover, the stunning success of Patton's Third Army had produced a military/political climate which would have made it hard for Eisenhower to give Montgomery what he wanted in any case.

Meanwhile, the Allied enthusiasm for Airborne operations had produced the First Allied Airborne Army. It contained six divisions and over 1500 transport aircraft plus gliders. The speed of the advance had meant that since D-Day, no operations had been possible. A total of 18 separate plans had been prepared and cancelled when the Germans were unsporting enough to retreat before they could be implemented.

This was a large force (one sixth of the total Allied strength) to have sitting around doing basically nothing. The Air Force wanted the pilots for the bomber offensive. The European commanders wanted air supply to help continue the advance. It was adding up to a *use it or lose it* situation.

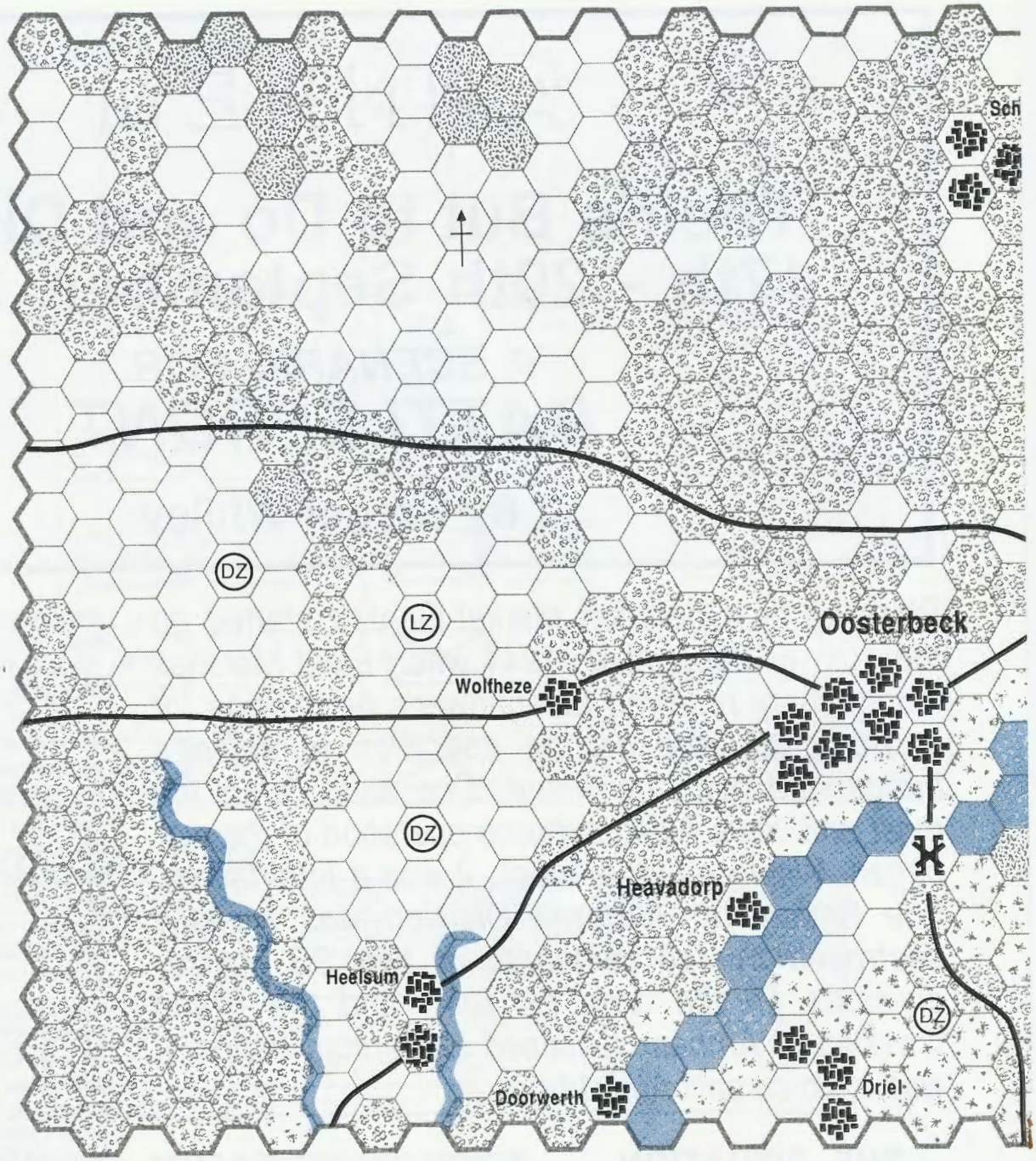
Montgomery's plan was thus expedient for a number of reasons. His stated aim was to bottle the Germans in Holland and render the approaches to Antwerp safe. His ultimate aim was to break through to the Ruhr and thrust towards Berlin. This way he could not be denied the supplies necessary to finish the job. For Eisenhower, it offered a use for his airborne troops.

Moreover, it was undeniably true that if a narrow front breakthrough were to be made then the North was the best place, if the difficult terrain of Holland could be negotiated and Antwerp was usable as a port.

Monty's plan was to use three airborne divisions to seize and hold the river and canal crossings between the Meuse-Escaut Canal where the British XXX Corps had gained a

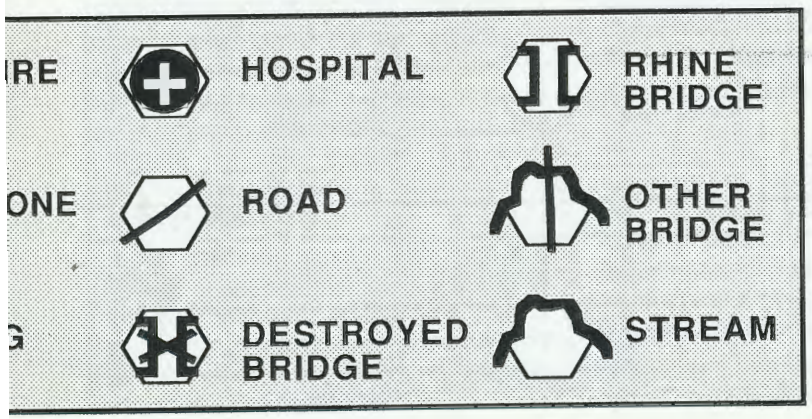
Continued on p.33

ARNHEM



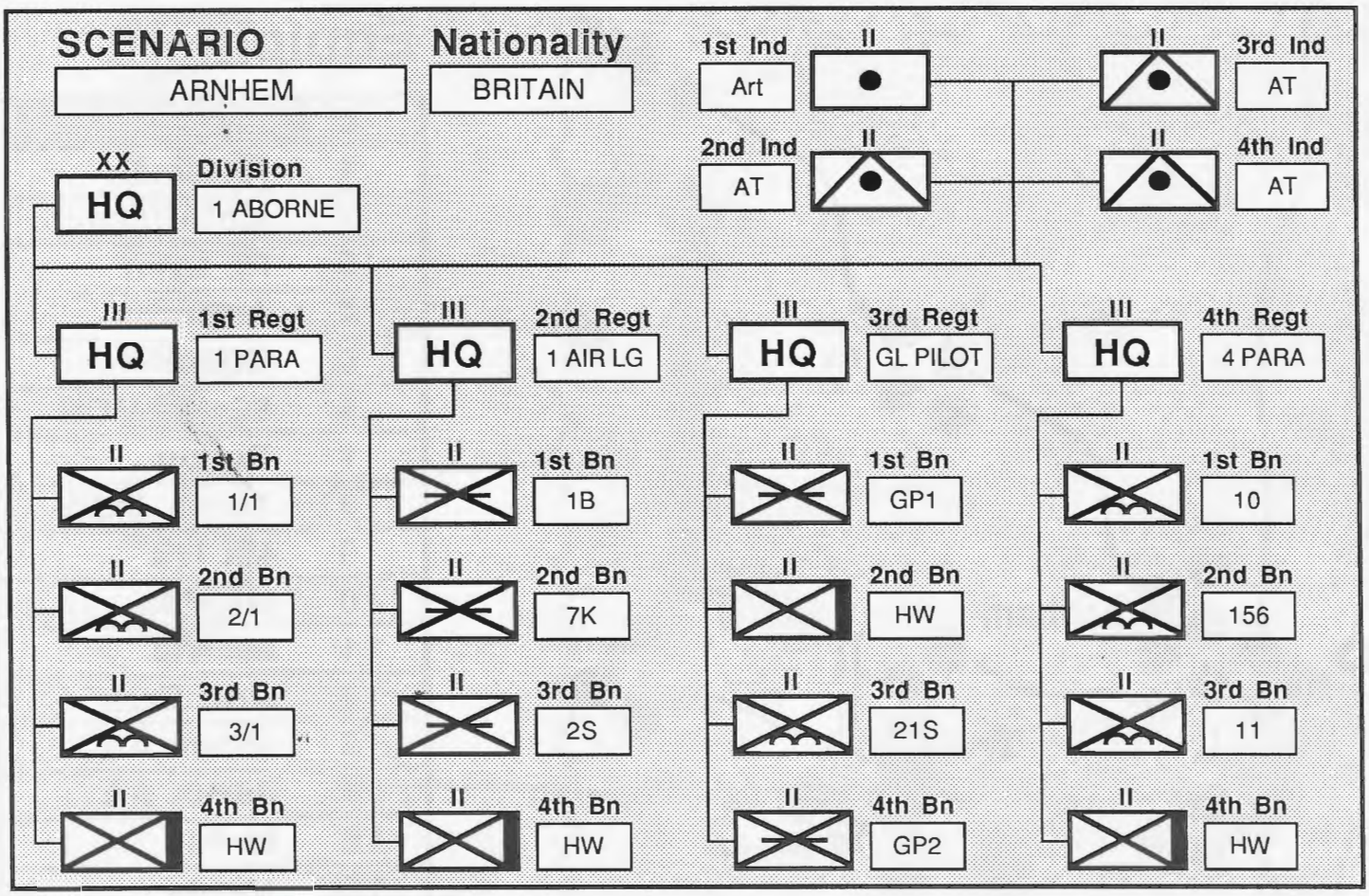
Terrain Key

RHINE RIVER	WOODS	QUAGM
CLEAR	POLDER	DROP Z
TOWN	BROKEN	LANDIN ZONE



Equipment

0	
1	Riflemen
2	Motorized
3	Pz Gren
4	Airborne
5	Glider
6	80mm MOR
7	Recon
8	75mm HOW
9	Mk IVs
10	Mk Vs
11	Mk VIs
12	Arm Cars
13	45mm AA
14	88mm AA
15	M-4s
16	M-10s
17	6 Pdr AA
18	17 Pdr AA
19	105mm SP
20	105mm HOW
21	150mm HOW
22	75mm PAK
23	Mixed AT
24	88mm AT
25	Assault
26	105mm RKT
27	
28	
29	
30	
31	

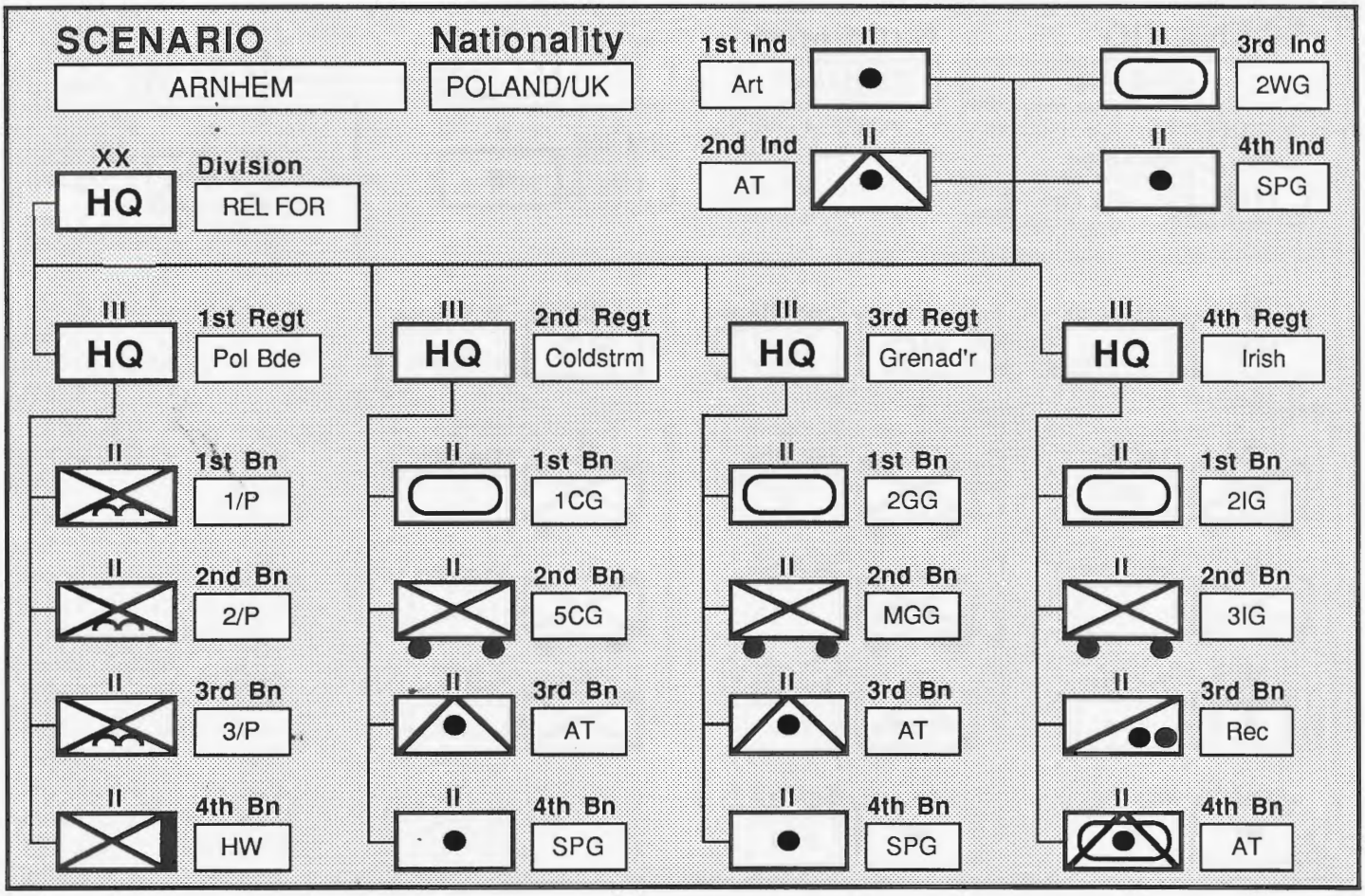


HEADQUARTERS DATA

FORMATION		XX HQ	1/RHQ	2/RHQ	3/RHQ	4/RHQ
HQ I.D.	[8]	1 ABORNE	1 PARA	1 AIR LG	GL PILOT	4 PARA
UNIT TYPE	[8]	PARA	PARA	GLIDER	GLIDER	PARA
HQ ADMIN	0-7	3	3	3	3	3
LEADERSHIP	0-7	5	5	5	5	5
HQ SUPPLY	0-7	4	4	4	4	4
ARRIVAL	0-63	0	N/A	N/A	N/A	N/A
LOCATION	(x,y)	10,13	N/A	N/A	N/A	N/A

BATTALION DATA

FORMATION	II/III	1/1	2/1	3/1	4/1	1/2	2/2	3/2	4/2	1/3	2/3	3/3	4/3	1/4	2/4	3/4	4/4	1/-	2/-	3/-	4/-
UNIT I.D.	[3]	1/1	2/1	3/1	HW	1B	7K	2S	HW	GP1	HW	21S	GP2	10	156	11	HW	Art	AT	AT	AT
LOCATION	(x,y)	7,15	8,14	8,15	9,15	7,11	8,10	7,12	8,11	7,16	8,16	7,15	8,14	3,10	3,11	4,9	4,10	7,14	8,13	9,14	7,13
CLASS	0-13	3	3	3	4	3	3	3	4	3	4	3	3	3	3	3	4	13	9	9	9
MODE	0-3	1	1	1	1	2	2	2	2	2	2	1	2	1	1	1	1	2	2	2	2
EQUIPM'T	0-31	4	4	4	6	5	5	5	6	5	6	4	5	4	4	4	6	22	17	17	17
MOVEMENT	0-31	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	16	14	14	14
STRENGTH	0-15	8	8	8	11	12	12	6	10	11	8	11	10	8	8	8	11	6	8	9	8
RATING	0-15	5	5	5	9	6	6	6	10	6	8	4	7	5	5	5	9	8	7	7	7
RANGE	0-15	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0	1	7	1	1	1
ARRIVAL	0-63	0	0	0	0	0	0	0	0	0	0	5	5	5	5	5	5	0	0	0	5
FATIGUE	0-7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
EXPERIENCE	0-7	7	7	7	7	6	6	6	6	7	6	6	7	6	6	6	6	7	6	6	6
ATTACHM'T	0-4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	1	1	2

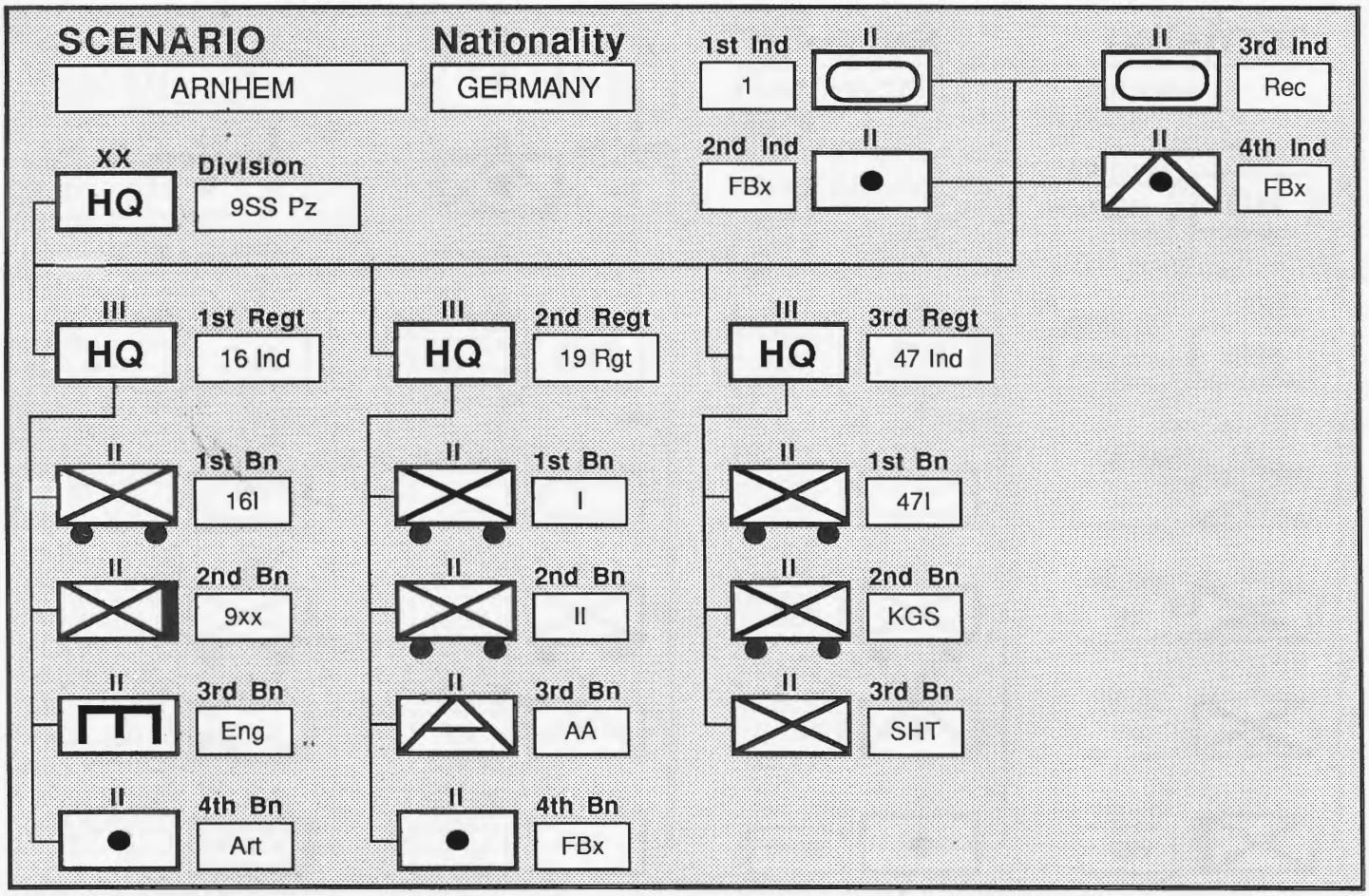


HEADQUARTERS DATA

FORMATION		XX HQ	1/RHQ	2/RHQ	3/RHQ	4/RHQ
HQ I.D.	[8]	REL FOR	Pol Bde	Coldstrm	Grenad'r	Irish
UNIT TYPE	[8]	MISC	PARA	GUARDS	GUARDS	GUARDS
HQ ADMIN	0-7	4	4	4	4	4
LEADERSHIP	0-7	5	4	4	4	4
HQ SUPPLY	0-7	5	5	7	7	7
ARRIVAL	0-63	17	N/A	N/A	N/A	N/A
LOCATION	(x,y)	22,20	N/A	N/A	N/A	N/A

BATTALION DATA

FORMATION	II/III	1/1	2/1	3/1	4/1	1/2	2/2	3/2	4/2	1/3	2/3	3/3	4/3	1/4	2/4	3/4	4/4	1/-	2/-	3/-	4/-
UNIT I.D.	[3]	1/P	2/P	3/P	HW	1CG	5CG	AT	SPG	2GG	MGG	AT	SPG	2IG	3IG	Rec	AT	Art	AT	2WG	SPG
LOCATION	(x,y)	18,17	18,19	20,17	20,19	23,20	23,20	23,20	23,20	23,20	23,20	23,20	23,20	23,20	23,20	23,20	23,20	19,18	18,18	23,20	23,20
CLASS	0-13	3	3	3	4	11	1	9	13	11	1	9	13	11	1	6	10	13	9	11	13
MODE	0-3	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
EQUIPM'T	0-31	4	4	4	6	15	2	17	19	15	2	18	19	15	2	12	16	22	17	7	19
MOVEMENT	0-31	14	14	14	14	20	20	20	20	20	20	20	20	20	20	20	16	14	14	20	16
STRENGTH	0-15	9	9	9	9	(15)	(11)	(7)	(7)	(15)	(8)	(5)	(7)	15	11	13	7	6	6	15	10
RATING	0-15	5	5	5	9	9	9	7	11	9	9	10	11	9	9	6	10	9	9	9	9
RANGE	0-15	0	0	0	1	1	0	1	4	1	0	1	4	1	0	0	1	8	1	1	9
ARRIVAL	0-63	17	17	17	17	13	13	13	13	15	15	15	15	17	17	17	17	17	17	19	19
FATIGUE	0-7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
EXPERIENCE	0-7	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5	5	4	4	5	5
ATTACHM'T	0-4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	1	4	4

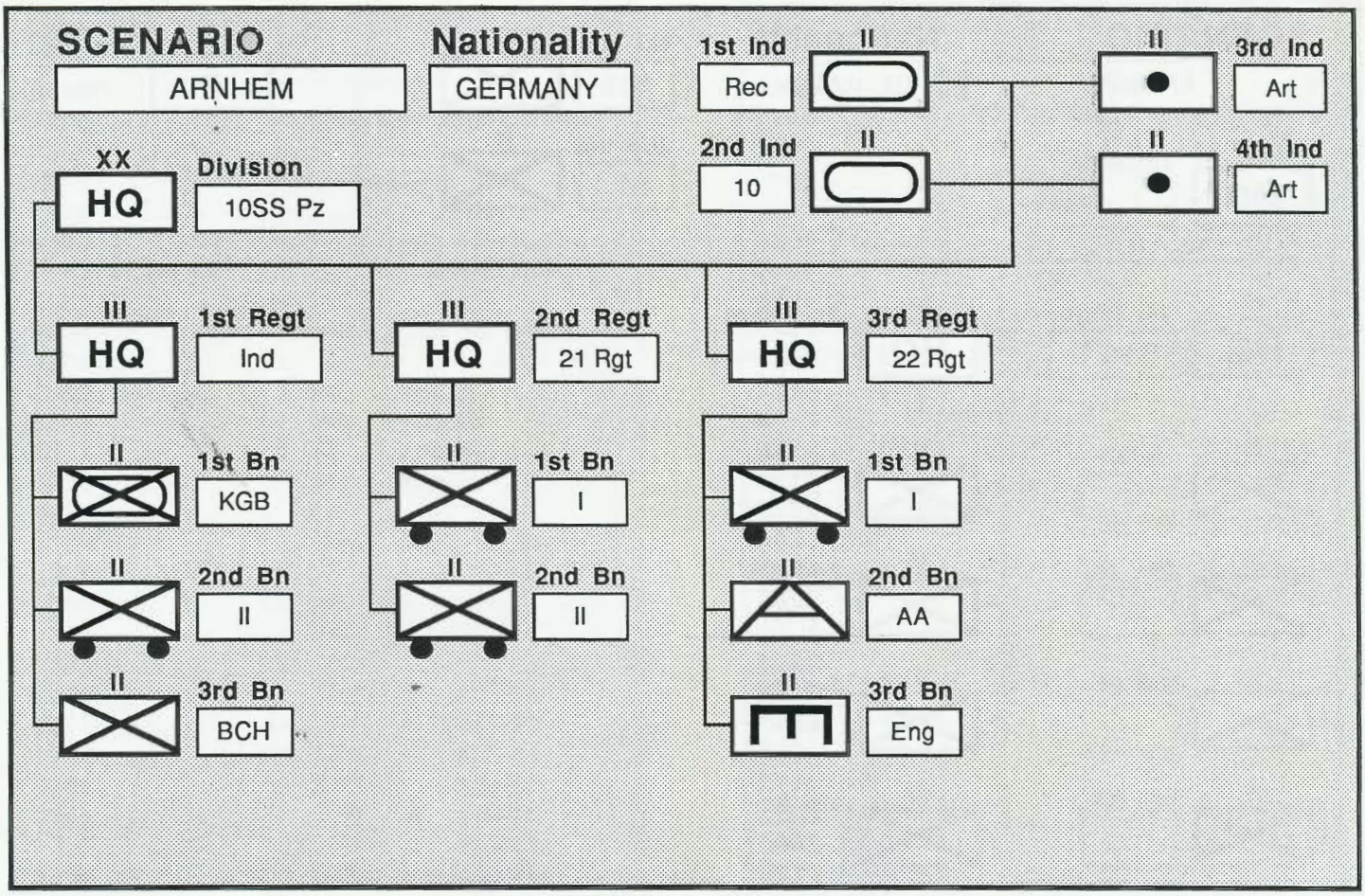


HEADQUARTERS DATA

FORMATION		XX HQ	1/RHQ	2/RHQ	3/RHQ	4/RHQ
HQ I.D.	[8]	9SS Pz	16 Ind	19 Rgt	47 Ind	
UNIT TYPE	[8]	PANZER	KFGRUPPE	SS PzGr	AD HOC	
HQ ADMIN	0-7	5	5	5	3	
LEADERSHIP	0-7	5	5	6	4	
HQ SUPPLY	0-7	6	5	5	5	
ARRIVAL	0-63	4	N/A	N/A	N/A	N/A
LOCATION	(x,y)	24,0	N/A	N/A	N/A	N/A

BATTALION DATA

FORMATION	II/III	1/1	2/1	3/1	4/1	1/2	2/2	3/2	4/2	1/3	2/3	3/3	4/3	1/4	2/4	3/4	4/4	1/-	2/-	3/-	4/-
UNIT I.D.	[3]	16I	9xx	Eng	Art	I	II	AA	FBx	47I	KGS	SHT						1	FBx	Rec	FBx
LOCATION	(x,y)	13,8	24,1	24,0	24,2	24,0	24,3	24,0	24,0	24,0	24,1	24,0						25,6	24,1	24,15	24,1
CLASS	0-13	1	4	7	13	1	1	8	13	1	1	0						11	13	11	9
MODE	0-3	0	0	0	0	0	0	0	0	0	0	0						0	0	0	0
EQUIPM'T	0-31	3	6	25	21	3	3	14	26	3	3	1						10	20	7	24
MOVEMENT	0-31	20	16	16	16	20	20	16	16	20	20	12						20	16	20	16
STRENGTH	0-15	8	9	7	3	5	5	8	4	8	6	7						7	9	4	11
RATING	0-15	10	12	10	12	10	10	12	12	9	9	7						12	10	10	10
RANGE	0-15	0	1	0	9	0	0	1	5	0	0	0						1	7	0	1
ARRIVAL	0-63	3	4	4	4	3	4	10	5	18	18	7						3	5	5	10
FATIGUE	0-7	2	7	7	7	7	7	7	7	7	7	7						7	7	7	7
EXPERIENCE	0-7	5	7	6	6	6	6	6	7	3	3	3						7	3	7	3
ATTACHM'T	0-4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	1	2	1

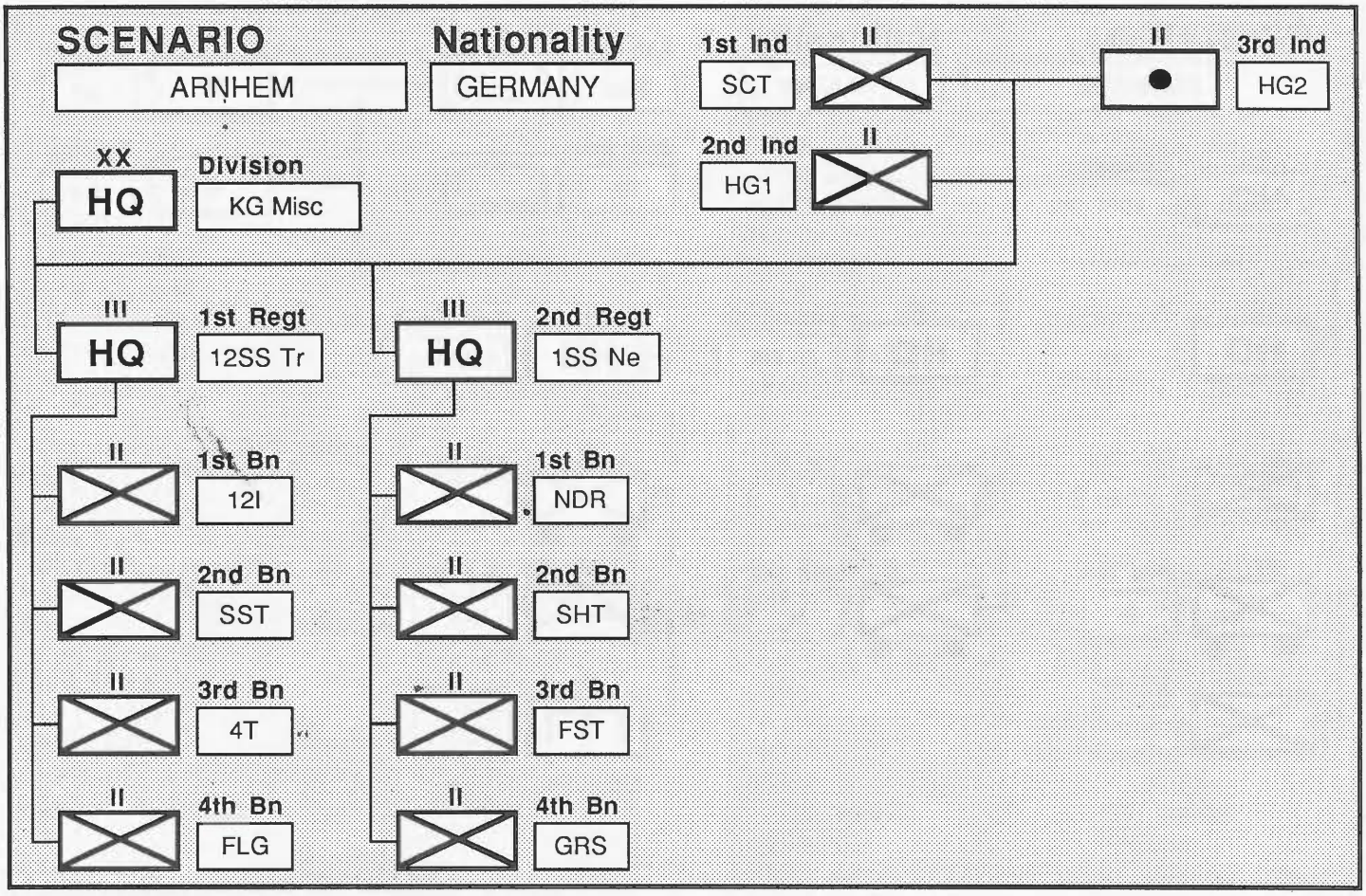


HEADQUARTERS DATA

FORMATION		XX HQ	1/RHQ	2/RHQ	3/RHQ	4/RHQ
HQ I.D.	[8]	10SS Pz	Ind	21 Rgt	22 Rgt	
UNIT TYPE	[8]	PANZER	KFGRUPPE	SS PzGr	SS PzGr	
HQ ADMIN	0-7	5	5	5	5	
LEADERSHIP	0-7	5	5	5	5	
HQ SUPPLY	0-7	6	5	5	5	
ARRIVAL	0-63	6	N/A	N/A	N/A	N/A
LOCATION	(x,y)	36,11	N/A	N/A	N/A	N/A

BATTALION DATA

FORMATION	II/III	1/1	2/1	3/1	4/1	1/2	2/2	3/2	4/2	1/3	2/3	3/3	4/3	1/4	2/4	3/4	4/4	1/-	2/-	3/-	4/-
UNIT I.D.	[3]	KGB	II	BCH		I	II			I	AA	Eng						Rec	10	Art	Art
LOCATION	(x,y)	36,1	37,12	36,1		35,12	36,11			36,1	37,12	37,11						35,1	34,12	36,1	35,12
CLASS	0-13	2	1	0		1	1			1	8	7						11	11	13	13
MODE	0-3	0	0	0		0	0			0	0	0						0	0	0	0
EQUIPM'T	0-31	3	3	1		3	3			3	13	25						7	10	20	21
MOVEMENT	0-31	20	20	12		20	20			20	16	16						20	20	16	16
STRENGTH	0-15	11	9	11		9	9			9	8	6						8	7	4	3
RATING	0-15	9	10	9		10	10			10	10	8						10	12	10	12
RANGE	0-15	0	0	0		0	0			0	0	0						0	1	7	9
ARRIVAL	0-63	6	6	6		5	5			3	5	5						4	5	4	5
FATIGUE	0-7	7	7	7		7	7			7	7	7						7	7	7	7
EXPERIENCE	0-7	4	6	4		6	6			6	6	6						7	7	6	6
ATTACHM'T	0-4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3	2	2	2



HEADQUARTERS DATA

FORMATION		XX HQ	1/RHQ	2/RHQ	3/RHQ	4/RHQ
HQ I.D.	[8]	KG Misc	12SS Tr	1SS Ne		
UNIT TYPE	[8]	DEPOT	TRAINING	DUTCH		
HQ ADMIN	0-7	3	3	3		
LEADERSHIP	0-7	4	4	4		
HQ SUPPLY	0-7	4	4	4		
ARRIVAL	0-63	6	N/A	N/A	N/A	N/A
LOCATION	(x,y)	6,20	N/A	N/A	N/A	N/A

BATTALION DATA

FORMATION	II/III	1/1	2/1	3/1	4/1	1/2	2/2	3/2	4/2	1/3	2/3	3/3	4/3	1/4	2/4	3/4	4/4	1/-	2/-	3/-	4/-
UNIT I.D.	[3]	12I	SST	4T	FLG	NDR	SHT	FST	GRS									SCT	HG1	HG2	
LOCATION	(x,y)	6,20	7,19	8,18	8,19	0,8	0,8	1,8	7,10									8,19	8,19	8,18	
CLASS	0-13	0	0	0	0	0	0	0	0									0	0	13	
MODE	0-3	0	0	0	0	0	0	0	0									0	0	0	
EQUIPM'T	0-31	1	1	1	1	1	1	1	1									1	1	8	
MOVEMENT	0-31	12	12	12	12	12	12	12	12									12	12	16	
STRENGTH	0-15	5	5	8	6	6	7	6	3									4	8	3	
RATING	0-15	7	7	8	7	6	7	7	5									7	7	8	
RANGE	0-15	0	0	0	0	0	0	0	0									0	0	9	
ARRIVAL	0-63	5	5	5	5	4	5	5	0									9	13	13	
FATIGUE	0-7	7	7	7	7	7	7	7	7									7	7	7	
EXPERIENCE	0-7	5	4	5	4	3	4	4	1									3	3	3	
ATTACHM'T	0-4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	1	1	

ARNHEM - Briefing

AXIS	ALLIED
SIDE [16]: GERMANY	SIDE [16]: UNITED KINGDOM
CORPS [16]: II SS Pz Korps	CORPS [16]: 1st AIRBORNE
COMMANDER [16]: Gen Bittrich	COMMANDER [16]: Gen Urquhart

DAY	NIGHT	SUPPORT	DAY	NIGHT
4	0	QUANTITY 0-99	8	0
0	0	RELIABILITY (0-3)	1	0
7	0	RATING (0-15)	13	0

AIR SUPERIORITY (0-7)

STATUS = 7
RELIABILITY = 7

STRONG ALLIED
DEPENDABLE

SCENARIO [16]: ARNHEM

BRIEFING [26]: "Their's But to Do and Die. . ." 17th-20th September, 1944

START DATA

(1-31)	DATE =	17	17th SEP 1944
(1-12)	MONTH =	9	
(0-63)	YEAR =	44	
(1-16)	LENGTH =	4	
(0-3)	WEATHER =	3	CLEAR
(0-7)	FORECAST =	7	CLEARING
(0-31)	MECH MIN =	16	

ARNHEM - Terrain Effects Chart

TERRAIN CODE (T0-T15)	TERRAIN NAME [10]	TERRAIN COSTS PER HEX		ATTACK EFFECTS		
		MECH (0-31)	NON-MECH (0-31)	ARM (0-7)	ART (0-7)	INF (0-7)
T0	RHINE R.	0	0	0	0	0
T1(RET)	CLEAR	1	1	7	7	7
T2	-	-	-	-	-	-
T3	POLDER	8	4	2	4	3
T4	WOODS	5	2	3	4	4
T5	-	-	-	-	-	-
T6	QUAGMIRE	0	0	0	0	0
T7	-	-	-	-	-	-
T8	-	-	-	-	-	-
T9	-	-	-	-	-	-
T10	BROKEN	9	7	2	4	3
T11	DEST BRGE	0	0	0	0	0
T12	-	-	-	-	-	-
T13	-	-	-	-	-	-
T14	FERRY	12	6	2	7	4
T15	RHINE BRGE	1	1	2	7	4
-	ROAD	1	1	N.A.	N.A.	N.A.
-	FORT	N.A.	N.A.	0	0	0
-	TOWN	N.A.	N.A.	5	6	5
-	BRIDGE	1	1	2	6	3
-	RIVER	N.A.	6	3	5	4

ARNHEM - Objectives

I.D. (1-24)	NAME [11]	MAP LOC [x,y]	START (0-63)	END (0-63)	POINTS PER TURN (0-30)	POINTS AT END (0-255)
1(AX)	4 Para DZ	4,10	2	7	5	10
2(AX)	1 AL LZ	8,11	2	7	2	10
3(AX)	1 Para DZ	8,15	2	7	8	15
4(AX)	Oosterbeck	17,13	2	15	15	100
5(AX)	Hospital	23,10	2	15	2	5
6(AX)	'The Bridge'	26,12	2	15	3	10
7(AX)	Heavadorp	15,16	9	15	8	100
8(AX)	Driel	17,19	9	15	1	5
9(AX)	Polish DZ A	28,16	(9)	(27)	(2)	(25)
10(AX)	Polish DZ B	19,18	(17)	(27)	(2)	(25)
11(AX)	-	-	-	-	-	-
12(AX)	-	-	-	-	-	-
1(AL)	4 Para DZ	4,10	1	5	15	5
2(AL)	1 AL LZ	8,11	1	4	5	5
3(AL)	1 Para DZ	8,15	1	4	5	5
4(AL)	Oosterbeck	17,13	2	15	5	50
5(AL)	Hospital	23,10	2	15	10	100
6(AL)	'The Bridge'	26,12	2	15	15	125
7(AL)	Heavadorp	15,16	9	15	10	50
8(AL)	Driel	17,19	(2)	(15)	10	50
9(AL)	Polish DZ A	28,16	(9)	(27)	(5)	(5)
10(AL)	Polish DZ B	19,18	(17)	(27)	(5)	(5)
11(AL)	-	-	-	-	-	-
12(AL)	-	-	-	-	-	-

ARNHEM - Miscellaneous Factors

ADJACENT ENEMY HEX PENALTY (0-15)

1st HEX =	0	4th HEX =	1
2nd HEX =	0	5th HEX =	2
3rd HEX =	0	6th HEX =	2

VICTORY POINTS PER STRENGTH POINT LOST (0-15)

	MECH	NON MECH
AXIS	5	5
ALLIED	4	4

MAP SIZE

ACROSS (0-2)	2
DOWN (0-3)	2

Continued from p.23

bridgehead and the Rhine at Arnhem. The US101st Airborne division was to capture bridges between Eindhoven and Veghel. The American 82nd Airborne was to capture the major river crossings at Grave and Nijmegen. The British 1st Airborne was at the end of the line, the bridges over the Rhine at Arnhem, sixty four miles away.

In two days, the XXX Corps troops, led by the Guards Armoured Division was to link up with each airborne division in turn, until they reached Arnhem.

Planning for this operation was, of necessity, rushed. The haste was necessary to exploit the imagined parlous state of the Germans. A number of critical decisions had to be made with no chance in the limited time available of changing them.

Critical decisions in this category includeddisregarding intelligence reports of German tanks, deciding to make only one airlift on the first day and positioning the drop zones a long way from the actual objectives.

The airdrop at Arnhem was perfectly performed and all elements landed with negligible opposition. Since a whole brigade was to be landed the next day, the 1st Airlanding Brigade had to stay behind and guard the drop zones. This left 1 Parachute Brigade and the divisional troops to strike out for the bridge.

They were not to get very far. Determined resistance initially from the 16th SS Training Battalion, and then from troops from the 9th SS Panzer Division held up most of the regiment well short of the Bridge. Portions of the 2nd Battalion, moving through the night, made it as far as the north end of the road bridge and set up shop. They were cut off from the rest of their regiment and the Germans held the southern end.

The situation on the second day, the last day on which the British might realistically have hoped to retrieve the situation, was not good. Radio communications had almost totally broken down.

This forced Urquhart, the divisional commander, to go into Arnhem itself to try to find out what was going on. He had been caught up in the fighting (personally despatching one German with his revolver) and was totally out of touch. Lathbury, commander of 1 Parachute Brigade was in a similar situation.

Moreover, close support air missions had been prohibited when transport aircraft were close to the target area. Given that the 1st Airborne lift was to extend over three days and that air liaison communications were as poor as the rest, not much could be expected in the way of air support.

The newly landed 4 Parachute Brigade was pressed into the attack. Over the next two days the rest of the division would try to force its way through to the 500 men holding out at the bridge. They would make little progress and take a lot of casualties.

Increasing German pressure was to turn the fight to reach the bridge into a fight for survival. Rescue, in the form of the arrival of XXX Corps, was remote. The division was hemmed into a small bridgehead around Oosterbeck. Attempts to reinforce this position with the Polish Brigade which landed south of the Rhine at Driel were unsuccessful. On the evening of the ninth day some 2398 officers and men of the 1st Airborne Division were evacuated across the Rhine. Left behind were 1400 dead and 6000 prisoners.

Operation Market-Garden was a failure. If the bridge over the Rhine was not captured then the expenditure of all those lives and resources was a complete waste. It is debatable as to whether the plan itself was militarily feasible. Even if it was, the ludicrously short period available for planning virtually guaranteed that things would go seriously wrong. They did.

THE SCENARIO

The scenario lasts for four days and covers the initial landing and fight for the bridge. After four days the men defending the bridge had been defeated and the rest of the 1st Airborne had given up all hope of reaching it.

The Rhine has been depicted as a one-hex wide river. That way nobody gets across except at a bridge. There are two special land hexes representing damaged and undamaged bridges respectively. The damaged bridge hex depicts the railway bridge which was blown by the Germans just as the British got to it.

There is also a ferry hex. The ferry at Driel was working for the first three days of the battle but the British ignored it.

SOME VARIATIONS

1. Two lifts on the first day. This was technically quite possible and should have been done. Advance the arrival turns of all day two arrivals to turn 3 on day 1. Remove the German GRS battalion which is there to persuade the 1AL to guard the drop zone as they were supposed to.

2. Proper use of the Polish Brigade. The Polish Brigade were scheduled to drop just south of Arnhem on the 3rd day. Due to bad weather and the fact that the Germans owned the drop zone they were dropped southwest of Oosterbeck on the fifth day, from where they failed to materially influence the battle. For this reason they are not represented in the original scenario.

3. If the British player holds Arnhem Bridge, then the Poles could be dropped as intended south of the city. Otherwise, they can be dropped on any original DZ still controlled by the British or around Driel where they ended up. They can be used from Day 3, or Day 2 if the British do a double lift.

4. The Ferry. The British controlled a working ferry at Heavadorp for three days without ever using it. Replace the ocean hex at (16,17) with the ferry hex type already defined in the terrain list.

5. XXX Corps to the rescue. The OB list for the Poles also lists three regiments and two assets from the Guards Armoured Division. They can be thought of as the XXX Corps advance elements. If the British held the Arnhem Bridge and if the 82nd Airborne had captured the Nijmegen Bridge they could have arrived after about three days. As it was they were stopped south of Arnhem by troops of the 10th SS Panzer Division who were able to use the recaptured Arnhem bridge. To activate those units with a bracketed combat strength on the OB, alter the strength value from 0 to that shown in the brackets.

6. Better Air Support. Poor planning and worse communications meant that the total Allied Air Superiority counted for nothing on the ground. Since ground support techniques had worked in Normandy, they could have been made to work here. Give the Allies at least 25 Air Support points. More if you actually want to win as the British.

7. Extended Scenario. Change the game length from 4 to 7. The British will need some help, however, to avoid total destruction. ◆

PATTON VS ROMMEL

A review of Chris Crawford's latest game

*Chris Crawford, the talented computer game designer who has authored such titles as **EASTERN FRONT:1941**, **LEGIONAIRE** and **BALANCE OF POWER** (reviewed in Issue 2 of **Run 5**), has released a new game based on Operation Cobra, the Allied breakthrough in July, 1944, west of St. Lo.*

Patton vs Rommel is a game depicting the final, successful attempt by the Allies to break out of the Normandy area, Operation Cobra. The game covers the period from July 25th to August 8th 1944, for one or two players, and represents divisional level units.

The game begins shortly after the Allied carpet bombing of the German line, and the Allies have two air force units at their command, 2TAC and 9TAC, weather permitting.

PRESENTATION

The game comes in a square album cover with the manual in one sleeve and the disk tucked into a pouch inside. This is the way games should be packaged, bookshelf style. It is far superior to a box filled with padding and empty space. The cover is attractive and includes a map on the back showing the entire game screen. There's a photo of Chris on the inside cover, but exactly what kind of tank is he reclining on?

The Manual looks great but one of its most enjoyable features is that you only have to read page 3, the Quick Start Overview, to play your first game. The Manual, as well as concisely detailing game mechanics and giving strategy hints, includes a summary of the history of the Cobra campaign and a synopsis of the personalities of General George S. Patton and Field Marshal Erwin Rommel.

One innovation of the game is its approach to cartography. There are no squares or hexes; you are presented with a geographically accurate map. Terrain is represented by light and dark patches, there are white, wiggly road networks and towns are represented by circles of a size related to importance. It looks great! See the accompanying illustration.

TITLE	-	**Patton vs Rommel**
AUTHOR	-	**Chris Crawford**
PUBLISHER	-	**Electronic Arts** **1820 Gateway Drive,** **San Mateo, CA. 94404** **U.S.A.**
FORMAT	-	**Macintosh, 512K minimum**
PRICE	-	**$45 (US), $75 (AUST)**
REVIEWED BY	-	**Danny Stevens**
REVIEWED ON	-	**Macintosh Plus**

PLAYING THE GAME

When you boot the disk you are presented with an image of Patton and Rommel glaring at each other from opposite sides of the screen. The object of the game is to make your commander smile and the other one frown. At this point you may select to play Allied or German sides solo against the computer or play a two player game. You may also select three levels of play: Beginner, Intermediate and Expert.

Once the game starts the map is set up. It all fits on the screen so there's no scrolling around, and you enter your first order session. There is one order session at midnight each day, and the game executes in 5 min increments, pausing to display combat events. During the day new orders may be issued from your command division to any divisions within its command radius. You just click the mouse, play is suspended and a flashing circle appears showing which units are close enough to order around. This also includes reassigning the air force units to any of the indicated divisions, but you cannot then give their support back to any units outside of your command radius.

Orders are given to units by activating them with a mouse click and then pointing at a number of map locations. The unit will move from point to point in the indicated sequence, blasting away at any enemy units that get in its zone of control. When combat occurs it is animated; a screaming arrow dives from attacker to defender with a whump sound as it hits and perhaps the crunch of breaking morale, resulting in either attacker or defender flinching away.

At the end of the day your supreme commander shows up, glaring out of the screen at you and pointing a finger, to give you some friendly advice. "Don't attack units frontally." yells Patton, "Why don't you allow your troops to rest before a big battle?" asks Rommel.

Don't expect any congratulations for doing things right, although if you play an exceptional game then Chris has provided a heartwarming suprise for you when the battle's over. The advice feature is useful for getting beginners off the ground but

becomes annoying once you know what you're doing.

Sound, combat animation and friendly advice are all optional. I usually play with the sound and advice off and keep the animation on to draw my attention to the conflicts.

When giving orders to units it is important to consider the unit's facing. You do more damage attacking an enemy unit's flank or rear, which is an unusual thing to find in a game with division sized units. It can be hard to take advantage of facing in the beginners' game since facing is determined entirely by direction of movement as a division cannot be made to wheel in place.

LEVELS OF PLAY

The basic game merely allows movement orders and the assignment of air power. This is a fast and easy to learn game. The Intermediate level introduces attack, defence and movement modes, facing orders and a useful feature to instruct units to begin actions at a certain time. At this level you have a very stimulating strategy game with enough options to keep you happy through many battles.

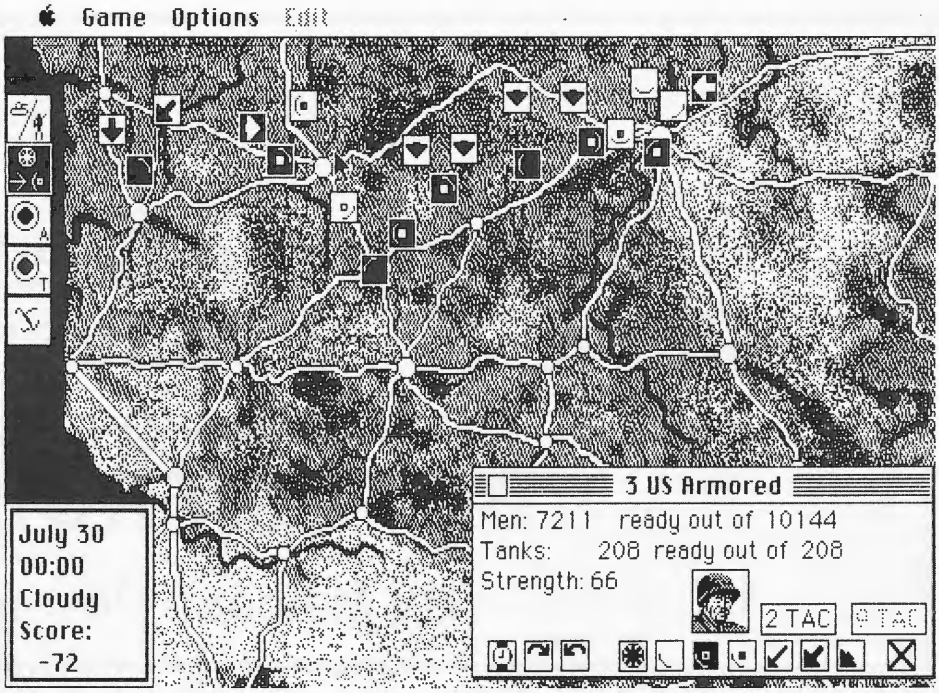
The expert game is really the wargame construction set. At this level you may edit all the units and features in the game environment.

Two player games of Patton vs Rommel are best when played at intermediate level.

WARGAME CONSTRUCTION SET

The important point to note is that you may not change the map and you cannot manipulate the weather. Apart from these, everything else may be altered. You may alter global variables that affect zone of control radius, airpower strength, the parameters for the various attack and defense modes etc. You may set up all the possible units with new starting locations, initial strength and time, reinforcement arrival times and so on.

All this is done after having started an Expert level game. You then save everything as a normal saved game. The construction set does not distinguish between a saved game and a scenario.



An intermediate level game in progress. The 3 US Armored Division is displayed and ready for orders. The icons on the left of the screen are used to select different display modes for the divisions; from top to bottom - unit type, unit facing, actual strength, total strength and morale.

HISTORY AND SIMULATION

The first thing the manual explains is that neither Patton or Rommel were actually there! It then explains that they did have an effect on the command style on both sides so may be considered to have been there at least in spirit.

There is no consideration given to line of supply in this game, which may not be considered critical at this level of simulation for the time period covered, but would have tidied up one of the problems with the way the game plays. Once there is a break in the lines, units from both sides can begin to run around claiming and reclaiming towns from one another in merry-go-round fashion. Units that have been crushed and end up routing behind friendly lines find it all too easy to reform to full strength and add to the confusion.

A further effect of this omission is that it becomes a disadvantage to surround enemy pieces. It is very difficult to wipe them out, especially playing against a computer player, and you must commit many divisions to containing the unit for a long period of time, even when its morale is cracked and its actual strength is very low.

Units are represented as a body count of men, artillery and tanks. No value is given to the quality of troops and armament or to the efficiency of the unit's command and administration, factors that have been shown to be very important historically.

The method of mapping homogenises terrain effects. For example, there is no situation where infantry would fare better than mechanised units because the game system does not know specifically what type of terrain is involved.

When a unit flinches in a battle it forgets all orders and adopts a defensive mode. The units do not show any initiative in determining if it may be safe to proceed with their orders at any time. It might, then, have been a better reflection of the situation to allow more frequent order sessions or at least one other at midday.

CONCLUSION

Patton vs Rommel is an enjoyable and fast paced strategy game. It is well presented and very good value for money. Although it does not rate strongly as a historical simulation it is a good introduction to strategy gaming and the criticisms are intended merely to be of use to serious simulation buffs.

I can recommend keeping an eye out for anything Chris Crawford does in the future and for this game right now. ◆

ANZIO

Bypassing the Gustav Line 22nd - 31st January, 1944

A SCENARIO FOR BATTLEFRONT

By Malcolm Power

From his sickbed in Tunis, Winston Churchill hatched the plan for 'Operation Shingle'. He became obsessed with the idea of a 'cat's claw' thrown behind the stalemate line in Italy. Intended as a quick way to break the deadlock, it envisaged a lightening strike from Anzio to cut German supply lines south-east of Rome, co-ordinated with an offensive by the Fifth Army against the Gustav Line at Cassino.

The landings could not have had a better start, achieving complete tactical surprise with no German units in the immediate vicinity.

All the ingredients were present for a stunning Allied victory. However, Anzio would develop into a bitter and protracted struggle. It would eventually lead Churchill, its creator, to lament "I had hoped that we would be hurling a wildcat ashore, but all we got was a stranded whale".

THE SITUATION

The Anzio area, just 33 miles from Rome, 20 miles west of the Alban Hills and 70 miles north-west of Cassino appeared to be an ideal location for an amphibious landing. In addition to being well within the range of fighter aircraft operating from the Naples area, it offered several useful topographical features.

Beaches suitable for landing craft existed both north and south of the town. The towns of Anzio and Neituno offered sheltered harbours useful for resupply and landing operations.

To the north the landing area was bounded by good defensive terrain, consisting of a fissured labyrinth of wadis and gullies that made armoured movement all but impossible.

To the south the Mussolini Canal, a 170' wide irrigation channel with large embankments formed an almost purpose built anti-tank obstacle. Beyond this the Pontine marshes further hampered mechanised movement. This area, like the Anzio area itself, was reclaimed land crisscrossed by small irrigation ditches. The area south of the canal had been flooded by the Germans turning it into a marsh.

Just inland of Anzio the Padiglione woods provided useful cover for supply dumps and artillery. Beyond the woods, pastureland (dotted with newly built fascist farms) ran to the foothills of the Alban hills. These hills would later provide an excellent artillery position for the Germans, allowing any position in the Beach-head to be targeted. Railway and road embankments provided good defensive positions and allowed movement even after heavy rain had turned the reclaimed pasture land into a quagmire. The German supply-line to Anzio runs via Campoleone and Cisterna. Beyond Cisterna the main supply lines to Cassino ran along the Velletri (Highway 7) and Valmonte (Highway 6).

As Anzio is situated on the west coast of Italy, the assault would be launched from

Naples. Because Naples was controlled by the U.S. Army they would be in charge of the operation. Yet it was clear that the Americans had little faith in the operation as proposed by Churchill.

The British believed that the US Fifth and British Eighth Armies' offensives would draw German reserves (3rdPzGr Div and Hermann Goering Div) from the Rome area and that the landing in the rear of the German XIV Corps would cause it to withdraw in an attempt to contain the beach-head.

For their part the Americans believed that the Germans would react violently and call on all available reserves from Italy and beyond to contain the beach-head.

The British wanted to gamble at Anzio, however the Americans stood to lose the most should this gamble fail. With the Salerno disaster weighing heavily on his mind, Clark anticipated heavy resistance on the beach-head and intended the advance troops to go immediately on the defensive. The decision on whether to advance was left to the Corps Commander, General Lucas. Clark knew Lucas was not a man to take risks, no doubt the main reason for his appointment.

Lucas was certainly pessimistic about the operation as the following quotes from his diary indicate;

"I felt like a lamb being led to the slaughter" and "the whole affair has a strong odour of Gallipoli and apparently the same amateur was on the Coaches' bench".

Lucas planned to land his men as soon as possible and ensure that he had fifteen days supplies with ten days ammunition. Then and only then would he consider an advance.

The landing craft approached the beach without any preliminary bombardment. Complete tactical surprise was achieved and first news seemed to have reached German Headquarters via a German railway engineer corporal stationed at Anzio who dashed off on a motor cycle to raise the alarm.

The American 15th, 30th and 7th Infantry regiments quickly established a perimeter based on the Mussolini Canal. To the north the British 1st Division experienced trouble moving troops over the soft dunes but they pushed north to the Moletta River and by dusk recon units were five miles inland from Anzio along the Via Anziate.

The three Ranger battalions landed at Anzio were soon in possession of the port and it was cleared allowing its use by LST's and other craft by the afternoon of the 22nd.

Field Marshal Kesselring had kept two divisions in reserve near Rome (3rdPz Gr and Hermann Goering) to guard against possible Allied landings on the Tyrrhenian coast. However, when assured by his intelligence staff that an invasion could not take place for four to six weeks he decided on Jan 18 to commit these units to the X Army along the Garigliano. (The British diversion was working).

When news of the invasion first reached Kesselring in the early hours of the 22nd he wasted no time in employing his genius for improvisation. By 0500 all available local troops had been mobilised. Every artillery piece, including A.A. units, were thrown into an organised cordon around the beach-head. His two divisions were withdrawn from the X Army and O.K.W. plan 'Marder' was activated. This plan called for reinforcements from outside the Italian area to repel Allied amphibious landings. This reaction had been predicted earlier by American planners.

The beach-head line was stabilised along the Mussolini Canal through to the Flyover and on to the Moletta River. Lucas decided to consolidate his position, preparing for the inevitable German counter-attack.

For his part Kesselring was prepared to allow General Eberhard Von Mackensen to prepare his defences. Any extra delay by Lucas was gratefully accepted.

On Jan 24 the 5th Grenadier Guards advanced to Aprilia, a model farm settlement that was promptly dubbed 'the factory'. They displaced the 3rd PzGren defenders with support from Tanks of the 46 Royal Tank Rgt and the Irish Guards. A determined counter-attack was repulsed on the 26th.

Meanwhile patrols from the US 3rd Div were making little progress towards Cisterna. Gen. Truscot decided on a two pronged attack towards Cisterna; one via Crocetta with the 30th Rgt supported by tanks and tank destroyers from the 751st and 601st battalions; the other by the 15th Rgt along the Conca, Isola Bella, Cisterna axis. These attacks went in on the 25th but the 30th Rgt was stopped in its tracks by the Hermann Goering Div after making only four miles and the 15th Rgt made just one and a half miles. Further attempts by the 3rd Division on the 26th and 27th could get no closer to Cisterna.

By Jan 28 the British 24th Guards Brigade had managed to move only one and a half miles forward from 'the factory'. The "cats claw" was getting stuck in the mud as persistent rain caused parts of the reclaimed land to revert to its original condition.

In spite of Allied air activity Kesselring succeeded in matching the Allied troop strength in the Anzio beach-head only one week after the landings commenced. Additionally, his heavy artillery could pound any area in the beach-head and German air raids were slowly increasing in intensity.

Gen Lucas was urged by Generals Alexander and Clark to take Cisterna and Campoleone. Both road centres provided equally good jump off points for Allied attacks out of the beach-head or German attacks into it. Coincidently, the Germans were also massing reinforcements to mount a counter-attack.

The Allied plan called for the the US 3rd Div with the 504th Parachute Rgt and four Ranger battalions to attack Cisterna. This attack was to have three axes of advance. Firstly, the 1st and 3rd Rangers would infiltrate along the Pantano Ditch. This irrigation channel runs from the west branch of the Mussolini Canal roughly parallel to the Conca-Cisterna road which it joins approximately one and a half miles south of Cisterna. secondly the remaining Rangers and the 15th Rgt were to attack along the Conca-Cisterna road via Isola Bella, flanked on the left by the 7th Rgt. Finally the 504th Parachute Rgt was to protect the right flank by making a diversionary attack along the Mussolini Canal.

The main thrust was to be made by the British 1st Div on Jan 30 against Campoleone supported by the US 1st Arm Div which was to advance north west from Carreceto on the right flank. Phase 1 of this went well with the 24 Gds penetrating to about 1 mile south of Campoleone railway station. After spending an uncomfortable night under constant shellfire the Sherwood Forresters took up the advance, but failed to cross the railway line even after further support from the armoured units.

Meanwhile the American 1st arm Div was struggling to advance on the British right. Stiff opposition by German units allowed little advance and Gen Lucas called off this part of the offensive after Jan 30.

The American advance on Cisterna began with the 1st and 3rd Rangers moving up along the Pantano ditch. When they emerged just over a mile from Cisterna they were decimated by a well laid ambush that cut them off from support. The beleaguered Rangers defended desperately until their

Equipment

0	
1	Pz Gren
2	Assault
3	105mmSP
4	150mmSP
5	155mmHOW
6	105mmHOW
7	150mmHOW
8	M10s
9	M4s
10	75mmAT
11	Stug IIIs
12	APC 234s
13	Mk IVs
14	Mk Vs
15	Gren
16	Half Trk
17	Paras
18	Jaegers
19	75mmHOW
20	17 Pdrs
21	M5s/APCs
22	Mxd HOWs
23	Mk VIs
24	SS PzGr
25	Mixed AA
26	88mmAT
27	Light Inf
28	Guards
29	Commando
30	Rangers
31	Riflemen

ammunition ran out about midday. Only six men escaped being captured troops from the Hermann Goering Div. The relief columns were stopped by stubborn resistance from elements of the Hermann Goering Div. Little progress was made on Jan 30.

During Jan 31 Gen Truscot renewed his attacks and almost succeeded in reaching Cisterna. The advance stalled only 1 mile short of its objective.

The Allied position after both offensives had concluded was a precarious one. Neither of the main objectives had been taken, and a German counter-attack was expected. The men were ordered to dig in and hold until reinforcements withdrawn from other areas in Italy could reach them. (Anzio is now weakening the Allied front at Cassino).

The Allied front line consisted of two salients. One pointed at Cisterna and the other at Campoleone. The British position was by far the worst, the bulge here was four miles deep and only two miles wide, an ideal place for the German counter-attacks to concentrate.

Gen Von Mackensen's initial objective was to eliminate the British salient and then regain 'the factory' and Carreceto as a jump off point for the major offensive planned to eliminate the Allied beach-head. The initial objectives were taken by Feb 12 during stormy weather that kept most of the Allied Aircraft grounded except for an initial onslaught that pulverised the 3rd Pz Gren Div's communications so badly that the commencement of the offensive was delayed for one day.

With the initial objectives intact, the major German offensive, dubbed 'Operation Fischfang' commenced on Feb 16. The main thrust against Anzio was made by 31 battalions from various units. These attacks would concentrate along the Via Anziate in an attempt to drive through to Anzio itself. A diversionary attack was also to be made by the Hermann Goering Div against the American positions at Isola Bella.

The assault went in and encountered dogged resistance from Allied troops. By often using night attacks to minimise the effect of Allied air support the Germans succeeded in forcing a salient along the Via Anziate as far as the flyover. They threw units across the fields in a desperate attempt to make the final breakthrough. The Allies mobilised all reserves including cooks and storemen to stem the tide. The line held, and on Feb 19 at the insistence of Generals Truscot and Clark, Lucas agreed to a counter-attack against the flank of the German salient.

This attack was made by the US 6th Arm Inf, 30th Rgt and a battalion of Shermans from the 1st Arm Rgt along the Padiglione-Carreceto road. Although heavy resistance from German Tiger tanks was initially encountered, the troops pushed forward. By 4 p.m. American units had taken 200 prisoners and penetrated to within two miles of Carreceto.

Hard fought local actions around the German salient continued as Allied and Axis units re-organised and brought forward reinforcements.

On Feb 29 the Germans attacked again in the Crocetta area. Little progress was made against the American 3rd Div's positions and Kesselring called off the attack on Mar 1.

Minor shifts in the front lines occurred as both sides stabilised their positions. A stalemate had developed and instead of Anzio breaking the Cassino deadlock, the Fifth and Eighth Armies' spring offensive launched on May 11 (4th Battle of Cassino), some three months later, would be the trigger to get things moving again.

The end result was far from that imagined by Winston Churchill when he originated the plan. The 'lightning strike' had resulted in a slow, costly advance. Eventually, the general withdrawal resulting from the Anzio breakout showed that the strategic basis for the landings was sound. If Gen. Lucas had been aggressive from the outset of the campaign, could this have occurred earlier?

THE SCENARIO

This scenario simulates the period from the initial landings up to the time that the Allied offensives are stopped at Cisterna and Campoleone. Allied and Axis troop strengths are approximately even at this point, and the Germans have some units available that were used in the counter-offensive to follow.

To win the Allied player must take and hold either or both of their primary objectives and maintain a stable front. Good results on one flank only may expose vulnerable rear areas to a crushing German counter thrust.

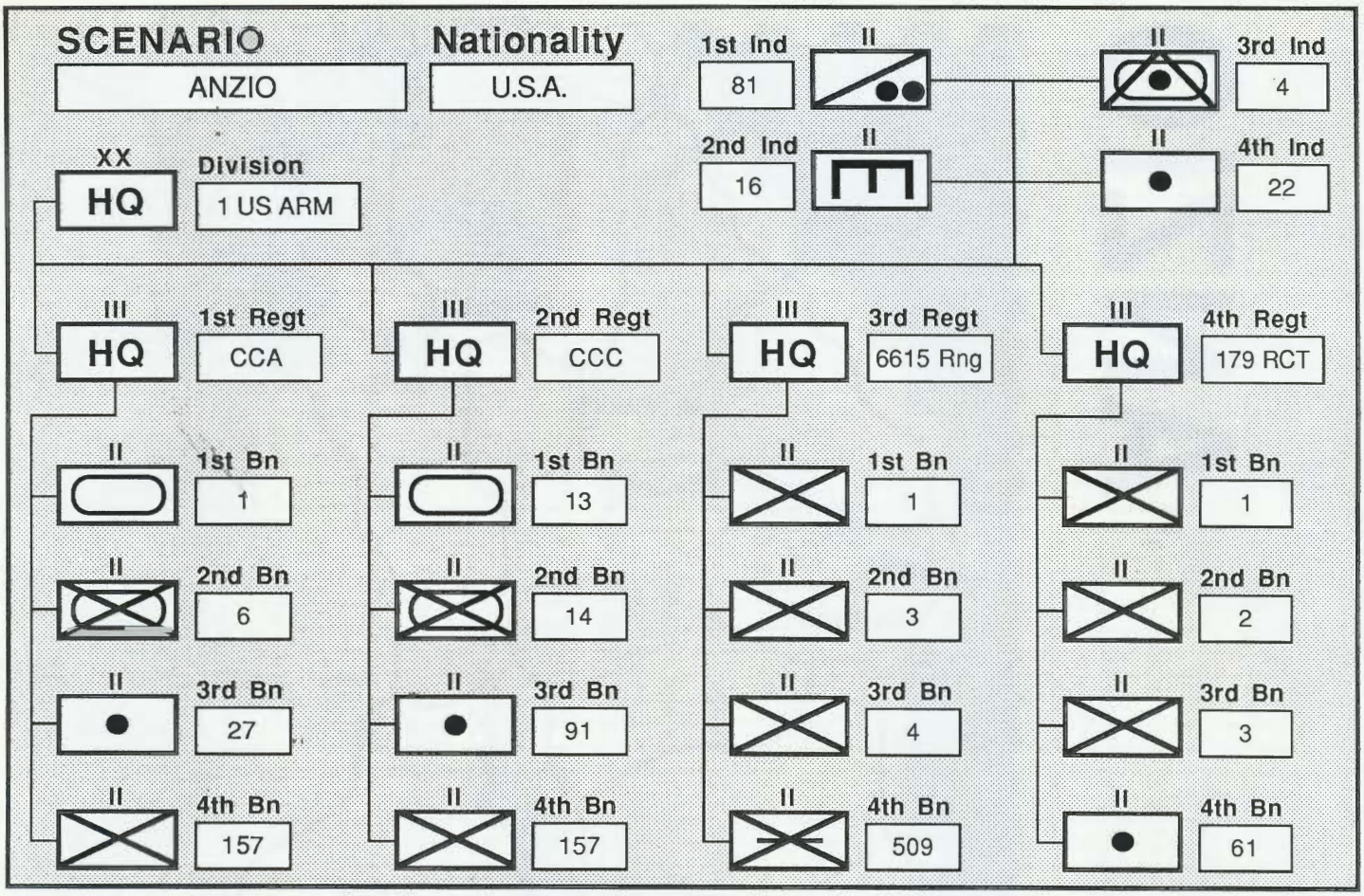
The Germans must hold on grimly to each objective while also trying to preserve units

Continued on p.48

ANZIO

Terrain Key

WATER	EMBANKMENT	STREAM BED	LARGE TOWN	THE FLYOVER
CLEAR	HEAVY WOODS	MARSH	SMALL TOWN	ROAD
LIGHT WOODS	WADI/ ROUGH	FOOTHILLS	VILLAGE	STREAM

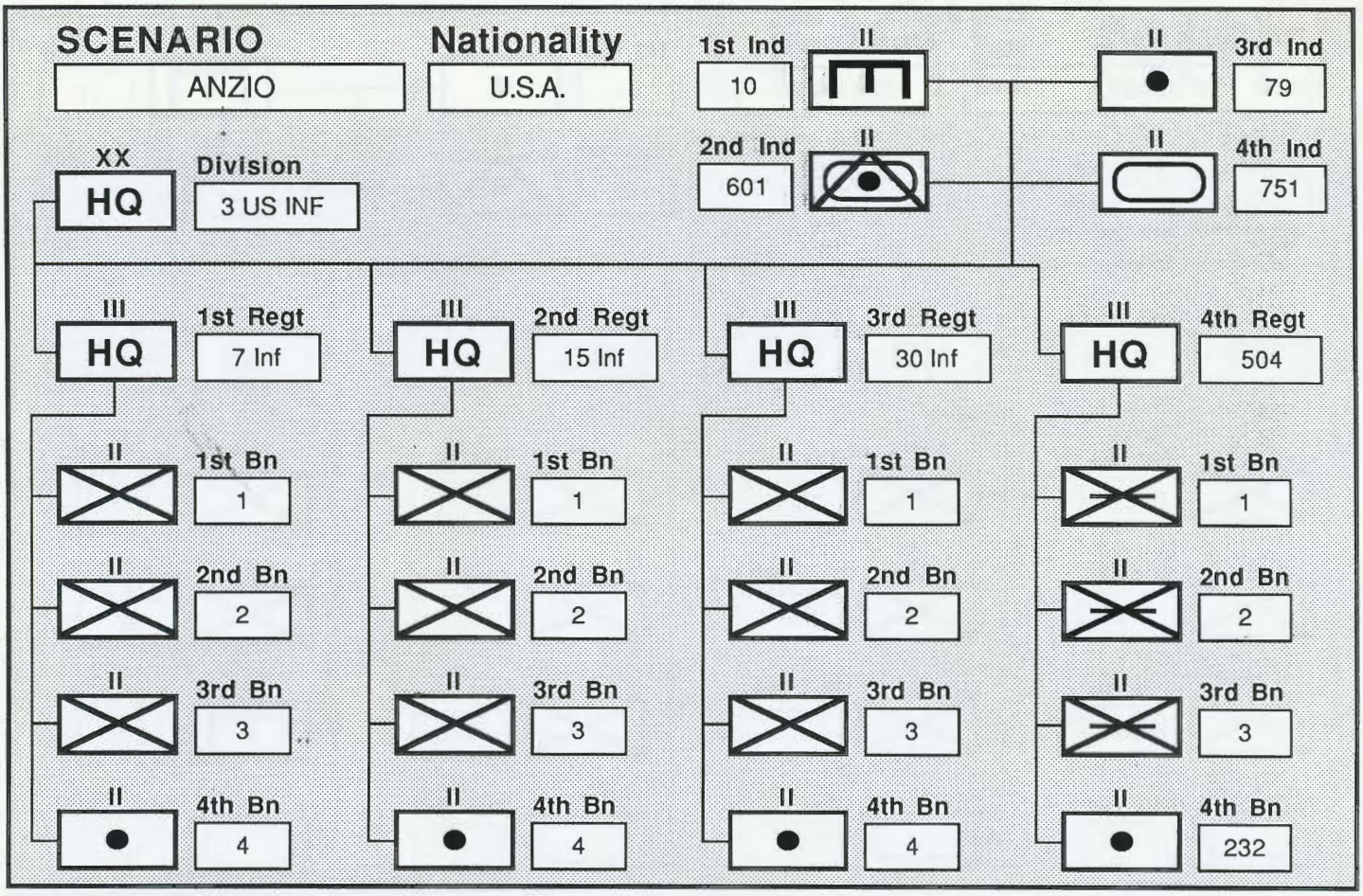


HEADQUARTERS DATA

FORMATION		XX HQ	1/RHQ	2/RHQ	3/RHQ	4/RHQ
HQ I.D.	[8]	1 US ARM	CCA	CCC	6615 Rng	179 RCT
UNIT TYPE	[8]	ARMOUR	ARMOUR	ARMOUR	RANGERS	INFANTRY
HQ ADMIN	0-7	5	5	5	6	4
LEADERSHIP	0-7	6	6	5	7	4
HQ SUPPLY	0-7	6	5	5	6	5
ARRIVAL	0-63	13	N/A	N/A	N/A	N/A
LOCATION	(x,y)	1,12	N/A	N/A	N/A	N/A

BATTALION DATA

FORMATION	II/III	1/1	2/1	3/1	4/1	1/2	2/2	3/2	4/2	1/3	2/3	3/3	4/3	1/4	2/4	3/4	4/4	1/-	2/-	3/-	4/-
UNIT I.D.	[3]	1	6	27	157	13	14	91	157	1	3	4	509	1	2	3	61	81	16	4	22
LOCATION	(x,y)	1,14	1,13	1,13	0,13	1,13	1,13	0,13	0,13	0,12	0,13	1,13	0,13	0,13	1,14	0,13	1,13	1,14	0,12	1,14	1,14
CLASS	0-13	11	2	13	0	11	2	13	0	0	0	0	3	0	0	0	13	6	7	10	13
MODE	0-3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
EQUIPM'T	0-31	9	16	3	31	9	16	3	31	30	30	30	17	31	31	31	6	21	2	8	3
MOVEMENT	0-31	16	16	16	8	16	16	16	8	8	8	8	8	8	8	8	12	20	16	16	16
STRENGTH	0-15	11	12	4	12	11	12	4	12	11	11	11	11	9	9	9	14	8	10	9	8
RATING	0-15	9	5	8	7	9	5	8	7	9	9	9	8	7	7	7	8	6	9	10	10
RANGE	0-15	1	0	8	0	1	0	8	0	0	0	0	0	0	0	0	8	0	0	1	8
ARRIVAL	0-63	7	6	7	32	10	9	11	32	0	0	0	2	9	9	10	11	2	2	10	5
FATIGUE	0-7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
EXPERIENCE	0-7	6	5	5	5	6	5	5	5	7	7	7	7	4	4	4	3	5	4	6	5
ATTACHM'T	0-4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3	3	2	3

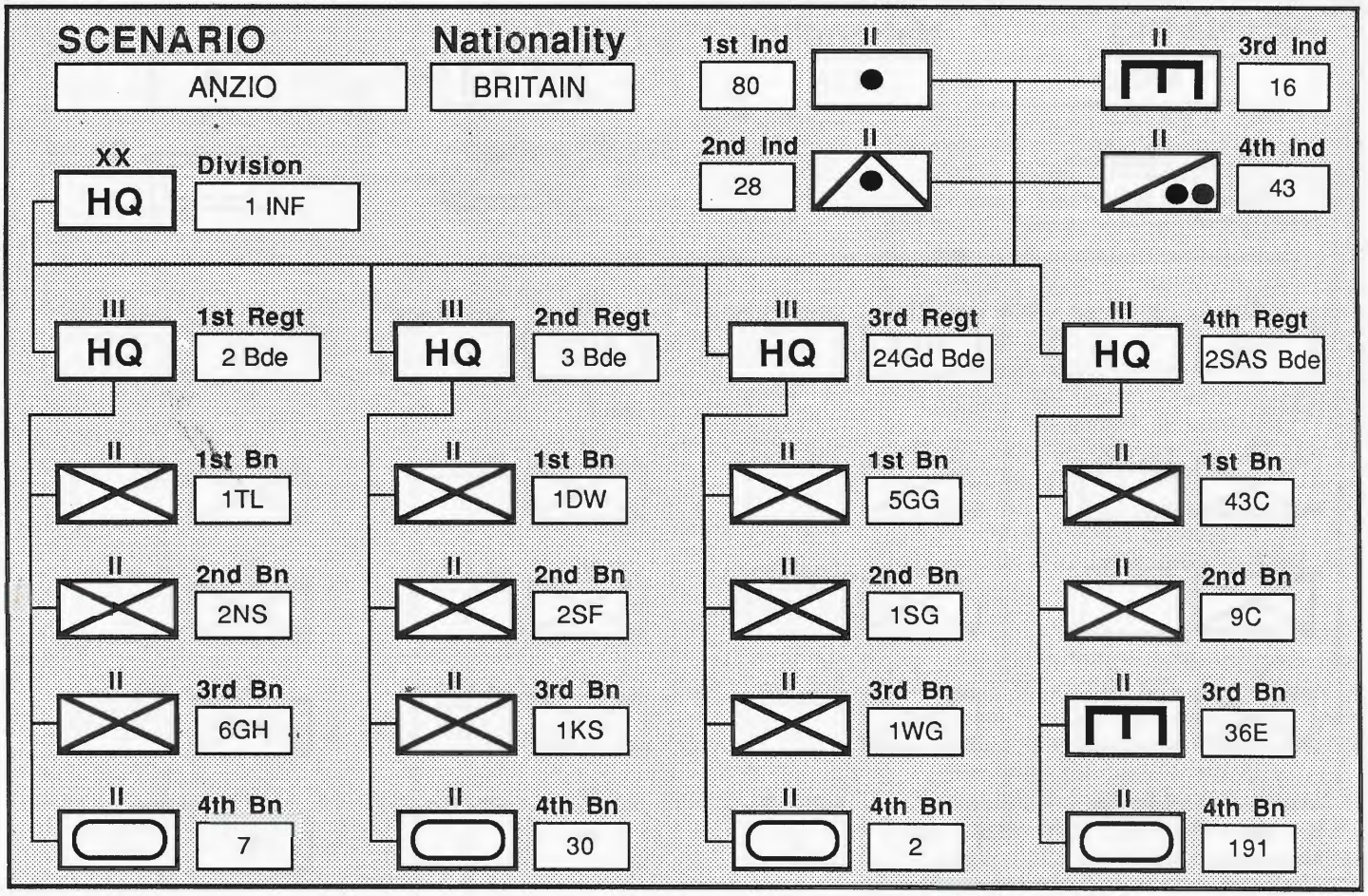


HEADQUARTERS DATA

FORMATION		XX HQ	1/RHQ	2/RHQ	3/RHQ	4/RHQ
HQ I.D.	[8]	3 US INF	7 Inf	15 Inf	30 Inf	504
UNIT TYPE	[8]	INFANTRY	INFANTRY	INFANTRY	INFANTRY	AIRBORNE
HQ ADMIN	0-7	5	5	5	5	5
LEADERSHIP	0-7	6	6	5	5	6
HQ SUPPLY	0-7	5	5	5	5	5
ARRIVAL	0-63	5	N/A	N/A	N/A	N/A
LOCATION	(x,y)	2,14	N/A	N/A	N/A	N/A

BATTALION DATA

FORMATION	II/III	1/1	2/1	3/1	4/1	1/2	2/2	3/2	4/2	1/3	2/3	3/3	4/3	1/4	2/4	3/4	4/4	1/-	2/-	3/-	4/-
UNIT I.D.	[3]	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	232	10	601	79	751
LOCATION	(x,y)	2,17	2,18	2,17	2,18	1,20	1,21	1,20	1,21	1,18	1,19	1,18	1,19	1,18	1,19	1,19	1,19	2,17	2,18	1,14	0,13
CLASS	0-13	0	0	0	13	0	0	0	13	0	0	0	13	3	3	3	13	7	10	13	11
MODE	0-3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
EQUIPM'T	0-31	31	31	31	6	31	31	31	6	31	31	31	6	17	17	17	19	2	8	6	9
MOVEMENT	0-31	8	8	8	12	8	8	8	12	8	8	8	12	8	8	8	12	8	16	12	16
STRENGTH	0-15	9	9	9	4	9	9	9	4	9	9	9	4	11	11	11	4	9	9	12	11
RATING	0-15	7	7	7	6	7	7	7	6	7	7	7	6	8	8	8	6	8	10	10	9
RANGE	0-15	0	0	0	6	0	0	0	6	0	0	0	6	0	0	0	6	0	1	14	1
ARRIVAL	0-63	0	0	2	2	0	0	0	3	0	0	2	3	5	5	6	7	2	3	6	7
FATIGUE	0-7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
EXPERIENCE	0-7	5	5	5	4	5	4	4	4	5	5	4	4	7	7	7	6	5	6	4	5
ATTACHM'T	0-4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2	3	2	1



HEADQUARTERS DATA

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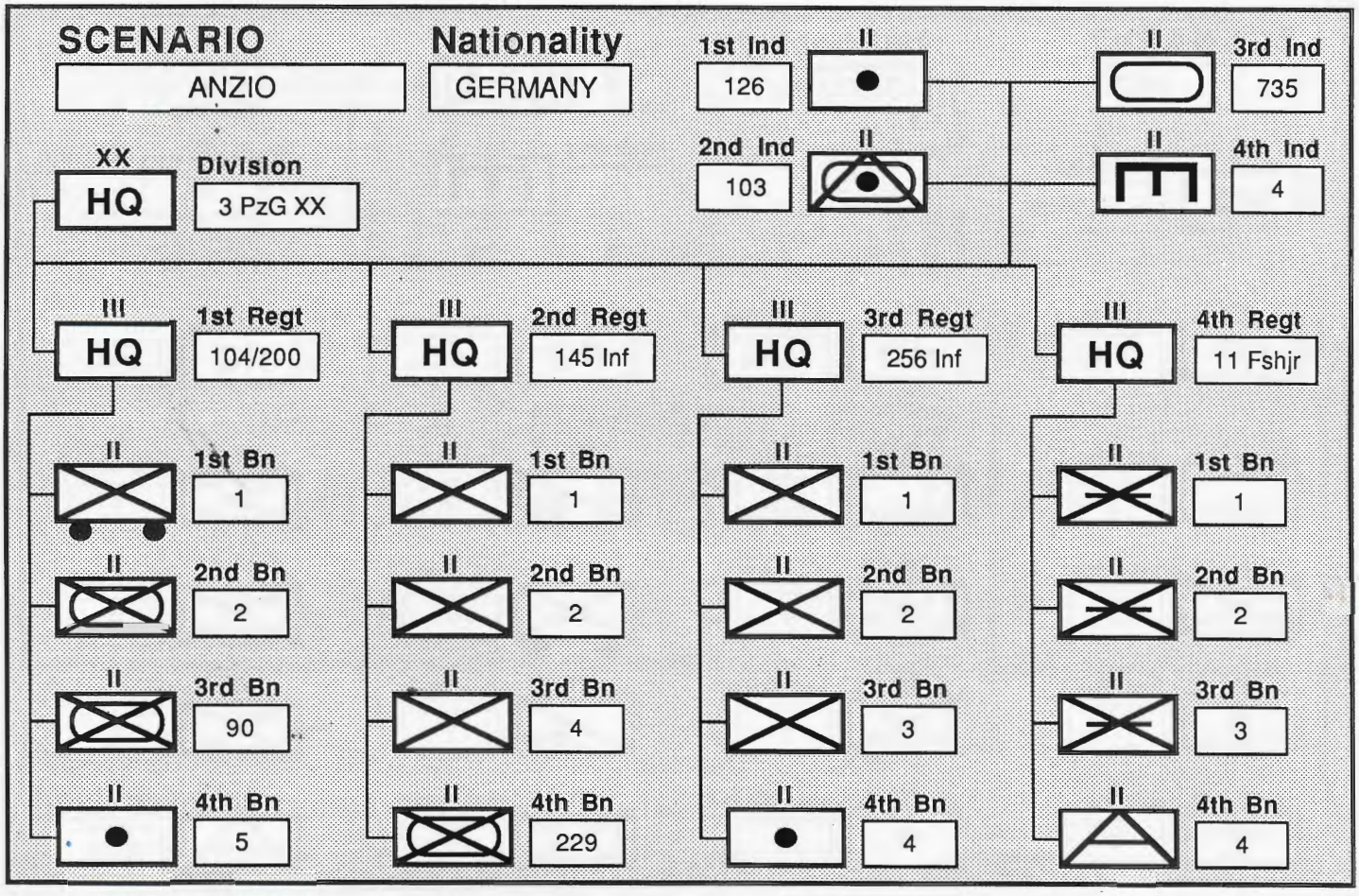
HQ I.D.	[8]	1 INF	2 Bde	3 Bde	24Gd Bde	2SAS Bde
UNIT TYPE	[8]	INFANTRY	INFANTRY	INFANTRY	GUARDS	COMMANDO
HQ ADMIN	0-7	5	5	5	5	6
LEADERSHIP	0-7	5	5	5	6	7
HQ SUPPLY	0-7	6	5	5	5	6
ARRIVAL	0-63	5	N/A	N/A	N/A	N/A
LOCATION	(x,y)	5,5	N/A	N/A	N/A	N/A

BATTALION DATA

FORMATION	II/III	1/1	2/1	3/1	4/1	1/2	2/2	3/2	4/2	1/3	2/3	3/3	4/3	1/4	2/4	3/4	4/4	1/-	2/-	3/-	4/-
UNIT I.D.	[3]	1TL	2NS	6GH	7	1DW	2SF	1KS	30	5GG	1SG	1WG	2	43C	9C	36E	191	80	28	16	43
LOCATION	(x,y)	6,3	5,3	5,4	0,12	5,3	5,4	4,5	0,12	6,3	5,3	5,4	0,13	4,5	3,5	0,13	0,13	0,12	5,3	1,13	1,14
CLASS	0-13	0	0	0	11	0	0	0	11	0	0	0	11	0	0	7	11	13	9	7	6
MODE	0-3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
EQUIPM'T	0-31	31	31	31	9	31	31	27	9	28	28	28	9	29	29	2	9	5	20	2	21
MOVEMENT	0-31	8	8	8	16	8	8	9	16	8	8	8	16	8	8	8	16	12	12	8	20
STRENGTH	0-15	9	9	9	11	9	9	9	11	10	10	10	11	10	10	12	11	12	11	9	8
RATING	0-15	7	7	7	9	7	7	7	9	8	8	8	9	10	10	6	9	11	5	8	6
RANGE	0-15	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	14	1	0	0
ARRIVAL	0-63	0	0	0	5	5	5	6	6	2	2	2	5	0	0	29	6	4	3	3	2
FATIGUE	0-7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	7	7	7
EXPERIENCE	0-7	6	6	6	5	5	5	5	5	6	6	6	5	7	7	4	5	4	5	5	6
ATTACHM'T	0-4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	3	1	3

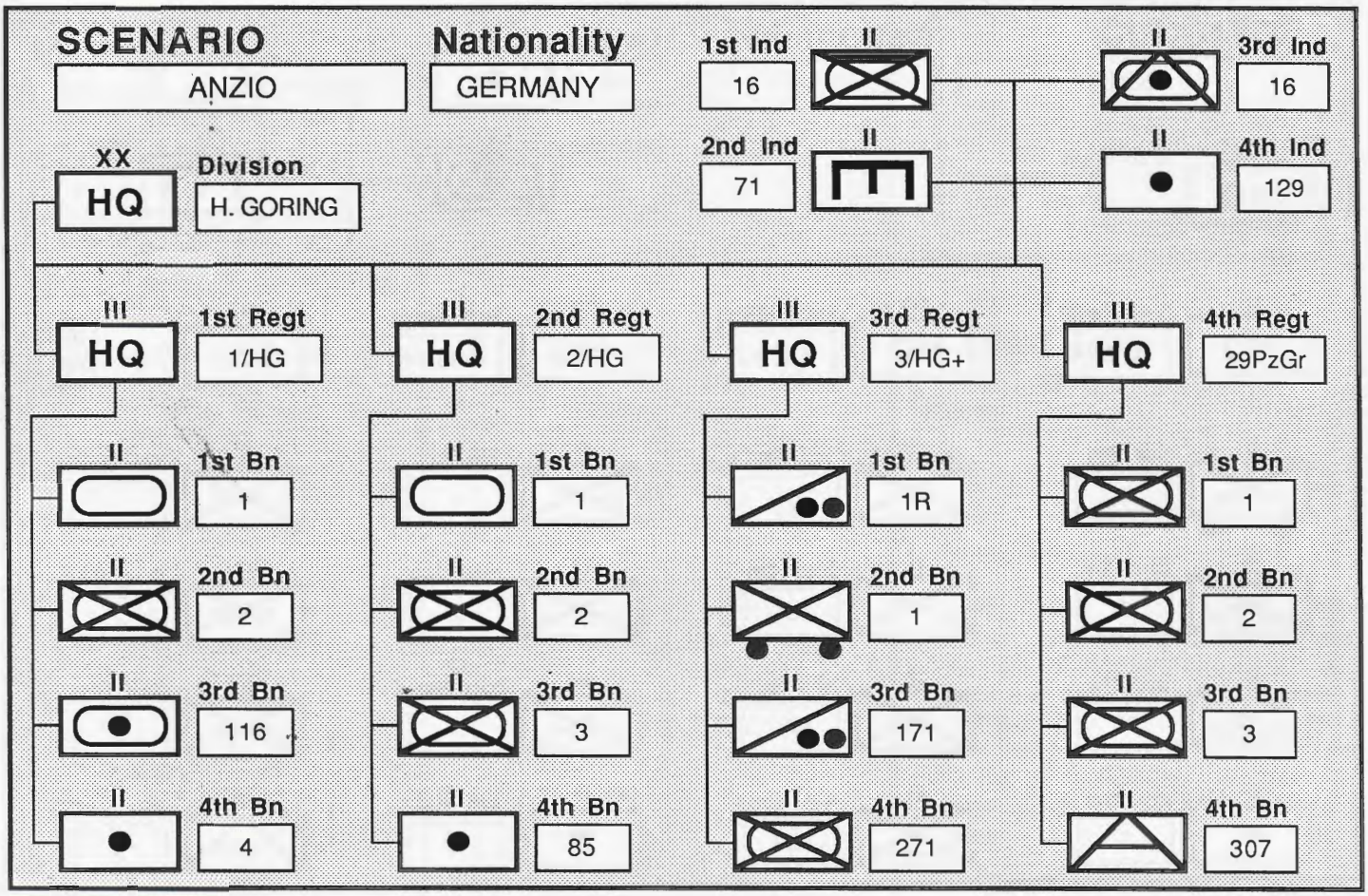


HEADQUARTERS DATA

FORMATION		XX HQ	1/RHQ	2/RHQ	3/RHQ	4/RHQ
HQ I.D.	[8]	3 PzG XX	104/200	145 Inf	256 Inf	11 Fshjr
UNIT TYPE	[8]	PzGr/Inf	PzGren	Gren/Inf	Gren/Inf	Airborne
HQ ADMIN	0-7	4	5	4	4	5
LEADERSHIP	0-7	6	5	5	4	6
HQ SUPPLY	0-7	6	6	6	6	6
ARRIVAL	0-63	5	N/A	N/A	N/A	N/A
LOCATION	(x,y)	25,2	N/A	N/A	N/A	N/A

BATTALION DATA

FORMATION	II/III	1/1	2/1	3/1	4/1	1/2	2/2	3/2	4/2	1/3	2/3	3/3	4/3	1/4	2/4	3/4	4/4	1/-	2/-	3/-	4/-
UNIT I.D.	[3]	1	2	90	5	1	2	4	229	1	2	3	4	1	2	3	4	126	103	735	4
LOCATION	(x,y)	25,14	25,14	25,14	24,15	25,4	24,5	25,4	25,4	25,4	25,4	25,4	25,4	25,0	25,0	25,0	25,0	25,14	24,15	24,15	12,14
CLASS	0-13	1	2	2	13	0	0	0	2	0	0	0	13	3	3	3	8	13	10	11	7
MODE	0-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EQUIPM'T	0-31	1	1	1	3	15	15	15	1	15	15	15	6	17	17	17	25	4	11	23	2
MOVEMENT	0-31	16	16	16	12	8	8	8	16	8	8	8	12	8	8	8	14	12	16	15	14
STRENGTH	0-15	9	9	12	9	9	9	9	12	9	9	9	8	10	10	10	10	15	8	9	10
RATING	0-15	8	8	8	10	7	7	7	10	7	6	6	9	7	7	7	7	13	11	14	7
RANGE	0-15	0	0	0	9	0	0	0	0	0	0	0	9	0	0	0	1	13	1	1	0
ARRIVAL	0-63	6	5	7	6	10	10	11	12	20	24	25	28	6	2	9	0	6	7	9	0
FATIGUE	0-7	6	7	7	7	7	7	7	7	6	6	6	6	7	5	7	4	7	7	7	2
EXPERIENCE	0-7	5	5	6	5	5	5	4	6	5	4	4	4	6	6	6	3	5	6	7	2
ATTACHM'T	0-4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4	1	1	4

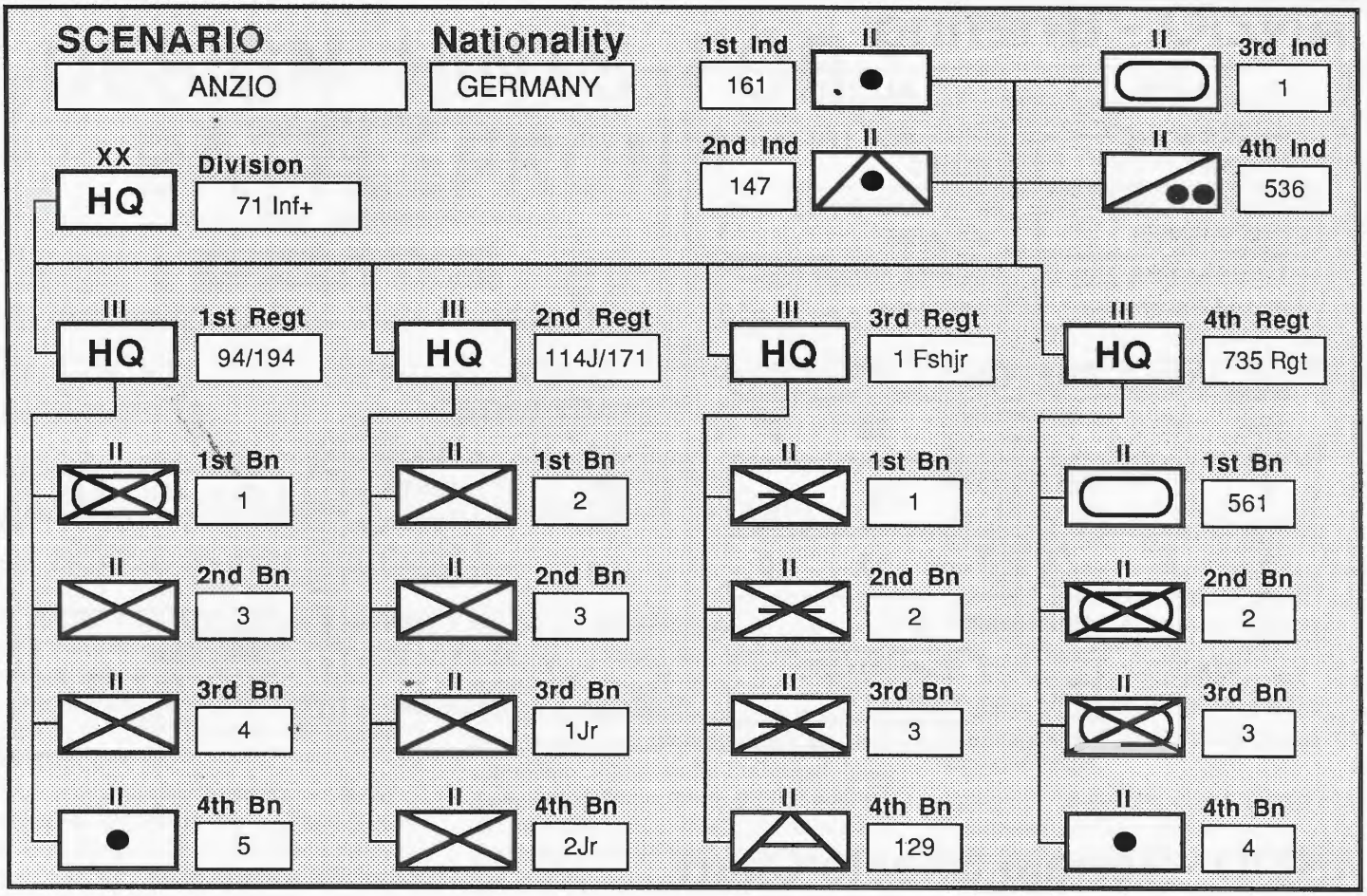


HEADQUARTERS DATA

FORMATION		XX HQ	1/RHQ	2/RHQ	3/RHQ	4/RHQ
HQ I.D.	[8]	H. GORING	1/HG	2/HG	3/HG+	29PzGr
UNIT TYPE	[8]	Panzer	Panzer	Panzer	Mixed	PzGren
HQ ADMIN	0-7	5	5	5	3	5
LEADERSHIP	0-7	7	7	6	6	7
HQ SUPPLY	0-7	6	6	6	6	6
ARRIVAL	0-63	3	N/A	N/A	N/A	N/A
LOCATION	(x,y)	25,17	N/A	N/A	N/A	N/A

BATTALION DATA

FORMATION	II/III	1/1	2/1	3/1	4/1	1/2	2/2	3/2	4/2	1/3	2/3	3/3	4/3	1/4	2/4	3/4	4/4	1/-	2/-	3/-	4/-
UNIT I.D.	[3]	1	2	116	4	1	2	3	85	1R	1	171	271	1	2	3	307	16	71	16	129
LOCATION	(x,y)	25,21	25,21	24,21	25,21	25,21	25,21	25,21	25,21	25,14	25,14	9,26	13,12	25,21	25,21	25,4	25,21	25,21	21,20	25,14	25,14
CLASS	0-13	11	2	12	13	11	2	2	13	6	1	6	2	2	2	2	8	2	7	10	13
MODE	0-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EQUIPM'T	0-31	14	1	11	22	13	1	1	6	12	1	12	1	1	1	1	25	24	2	11	7
MOVEMENT	0-31	16	16	16	16	16	16	16	14	20	16	20	16	16	16	16	14	16	16	16	14
STRENGTH	0-15	9	12	9	8	9	12	12	8	5	8	7	9	10	10	11	10	14	10	8	15
RATING	0-15	12	8	11	10	12	8	8	10	6	7	9	8	8	8	9	7	12	10	11	13
RANGE	0-15	1	0	1	9	1	0	0	9	0	0	0	0	0	0	0	1	0	0	1	15
ARRIVAL	0-63	8	7	8	9	13	14	16	18	2	3	0	0	20	21	2	2	23	0	16	9
FATIGUE	0-7	7	7	7	7	7	7	7	7	5	5	3	3	6	6	5	4	7	4	7	7
EXPERIENCE	0-7	7	7	7	6	7	7	6	6	4	4	5	6	6	5	7	3	7	5	7	6
ATTACHM'T	0-4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4	3	2	3



HEADQUARTERS DATA

FORMATION		XX HQ	1/RHQ	2/RHQ	3/RHQ	4/RHQ
HQ I.D.	[8]	71 Inf +	94/194	114J/171	1 Fshjr	735 Rgt
UNIT TYPE	[8]	Mxd Inf	PzGren	Jgr/PzGr	Airborne	Panzer
HQ ADMIN	0-7	4	4	4	5	5
LEADERSHIP	0-7	6	5	5	5	7
HQ SUPPLY	0-7	5	6	6	6	6
ARRIVAL	0-63	23	N/A	N/A	N/A	N/A
LOCATION	(x,y)	25,8	N/A	N/A	N/A	N/A

BATTALION DATA

FORMATION	II/III	1/1	2/1	3/1	4/1	1/2	2/2	3/2	4/2	1/3	2/3	3/3	4/3	1/4	2/4	3/4	4/4	1/-	2/-	3/-	4/-
UNIT I.D.	[3]	1	3	4	5	2	3	1Jr	2Jr	1	2	3	129	561	2	3	4	161	147	1	536
LOCATION	(x,y)	25,6	25,7	25,5	25,6	25,4	25,4	25,4	25,4	25,14	25,14	24,15	24,5	25,14	25,14	25,14	25,14	24,15	25,0	25,0	24,21
CLASS	0-13	2	0	0	13	0	0	0	0	3	3	3	8	11	2	2	13	13	9	11	6
MODE	0-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EQUIPM'T	0-31	1	15	15	6	15	15	18	18	17	17	17	25	23	1	1	3	7	26	14	12
MOVEMENT	0-31	16	8	8	12	8	8	9	9	8	8	8	14	15	16	16	16	12	12	16	20
STRENGTH	0-15	12	9	9	12	9	9	10	10	10	10	10	10	9	10	10	8	15	8	9	6
RATING	0-15	8	7	7	10	7	7	6	6	8	8	7	7	14	8	8	10	13	10	12	7
RANGE	0-15	0	0	0	9	0	0	0	0	0	0	0	1	1	0	0	9	15	1	1	0
ARRIVAL	0-63	19	21	21	23	21	21	22	23	24	22	24	2	26	24	27	31	22	20	19	22
FATIGUE	0-7	6	6	6	6	6	6	6	6	6	6	6	6	7	7	7	7	7	7	7	7
EXPERIENCE	0-7	6	5	5	4	5	4	6	6	6	6	5	3	7	5	5	4	5	5	7	6
ATTACHM'T	0-4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3	1	1	3

ANZIO - Briefing

AXIS	ALLIED
SIDE [16]: GERMANY	SIDE [16]: ALLIES
CORPS [16]: LXXVI PANZER	CORPS [16]: XIV ARMY
COMMANDER [16]: Gen von Mackensen	COMMANDER [16]: Gen Lucas

DAY	NIGHT	SUPPORT	DAY	NIGHT
15	10	QUANTITY 0-99	25	8
1	1	RELIABILITY (0-3)	2	2
8	8	RATING (0-15)	12	10

AIR SUPERIORITY (0-7)

STATUS = 5

RELIABILITY = 2

WEAK ALLIED

VARIABLE

SCENARIO [16]: ANZIO

BRIEFING [26]: Bypassing the Gustav Line 22nd to 31st January, 1944

START DATA

(1-31)	DATE =	22	22nd JAN 1944
(1-12)	MONTH =	1	
(0-63)	YEAR =	44	
(1-16)	LENGTH =	10	
(0-3)	WEATHER =	3	CLEAR
(0-7)	FORECAST =	3	BUILDING
(0-31)	MECH MIN =	12	

ANZIO - Terrain Effects Chart

TERRAIN CODE (T0-T15)	TERRAIN NAME [10]	TERRAIN COSTS PER HEX		ATTACK EFFECTS		
		MECH (0-31)	NON-MECH (0-31)	ARM (0-7)	ART (0-7)	INF (0-7)
T0	SEA	0	0	0	0	0
T1(RET)	CLEAR	3	1	7	7	7
T2	LT WOODS	4	1	5	6	7
T3	EMBANKMENT	6	2	4	6	6
T4	HVY WOODS	12	3	4	4	6
T5	WADI/ROUGH	18	5	1	3	4
T6	STREAM BED	12	3	2	4	4
T7	MARSH	16	2	6	6	7
T8	-	-	-	-	-	-
T9	SMALL	5	2	3	6	6
T10	FOOTHILLS	2	1	7	6	7
T11	FLYOVER	5	2	3	5	5
T12	LARGE	5	2	3	6	6
T13	VILLAGE	5	2	3	6	6
T14	"FACTORY"	5	2	3	6	6
T15	RAILWAY ST	3	2	3	6	6
-	ROAD	1	1	N.A.	N.A.	N.A.
-	FORT	N.A.	N.A.	0	0	0
-	TOWN	N.A.	N.A.	2	5	4
-	BRIDGE	2	2	5	7	5
-	RIVER	N.A.	7	4	7	4

ANZIO - Objectives

I.D. (1-24)	NAME [11]	MAP LOC [x,y]	START (0-63)	END (0-63)	POINTS PER TURN (0-30)	POINTS AT END (0-255)
1(AX)	Anzio	1,12	2	39	30	255
2(AX)	Nettuno	2,14	2	39	30	255
3(AX)	The Flyover	11,8	1	39	5	100
4(AX)	Padiglione	13,12	1	39	5	80
5(AX)	Conca	11,19	1	39	5	100
6(AX)	Carreceto	15,6	1	39	4	80
7(AX)	Aprilia	16,7	1	39	4	60
8(AX)	Campoleone	20,6	1	39	4	50
9(AX)	Isola Bella	18,20	1	39	5	30
10(AX)	Cisterna	21,20	1	39	6	50
11(AX)	Sessano	14,26	1	39	1	5
12(AX)	Crocetta	16,15	1	39	3	30
1(AL)	Anzio	1,12	1	39	1	50
2(AL)	Nettuno	2,14	1	39	1	50
3(AL)	The Flyover	11,8	1	39	3	20
4(AL)	Padiglione	13,12	1	39	3	20
5(AL)	Conca	11,19	1	39	3	20
6(AL)	Carreceto	15,6	5	39	2	30
7(AL)	Aprilia	16,7	7	39	3	40
8(AL)	Campoleone	20,6	1	39	10	50
9(AL)	Crocetta	16,15	1	39	1	5
10(AL)	Cisterna	21,20	1	39	10	50
11(AL)	Sessano	14,26	25	39	0	5
12(AL)	Isola Bella	18,20	1	39	2	10

ANZIO - Miscellaneous Factors

ADJACENT ENEMY HEX PENALTY (0-15)

1st HEX =	0	4th HEX =	1
2nd HEX =	0	5th HEX =	2
3rd HEX =	1	6th HEX =	3

VICTORY POINTS PER STRENGTH POINT LOST (0-15)

	MECH	NON MECH
AXIS	1	1
ALLIED	1	1

MAP SIZE

ACROSS (0-2)	1
DOWN (0-3)	3

Continued from p.38

for later offensive use. If the Axis player can take and hold Anzio or Nettuno for several turns he will win the game.

For both sides, maintaining a reserve is crucial. Uncontacted units can quickly seize an open objective or plug a hole when needed.

SOME VARIATIONS

1. The invasion convoy was not spotted en route to Anzio by German air reconnaissance and German Agents in Naples did not reported the increased shipping movements in the port. Assume that German Intelligence was more *intelligent* and provided Kesselring with a warning of the impending invasion.

Advance the arrival of the listed units by the specified number of turns; 1/HG (4 turns), 2/HG (6 turns) and the 256 Inf (18 turns).

2. President Roosevelt delayed the departure of 56 LSTs from the Mediterranean to allow their use at Anzio. Additionally the Allies were extremely lucky to capture the Port of Anzio in such good condition. Assume the Port of Anzio is more extensively damaged and fewer LST's are available, therefore delaying supply buildup and the landing of armoured units.

Delay the arrival dates of the listed units by the specified number of turns; CCA (8 turns), CCC (10 turns) and the 179 RCT (8 turns).

3. Miserable weather conditions prevailed over the beach-head for periods throughout the campaign, beginning just two days after the landings. Without these periods of poor flying weather Allied air support would have been more effective. Assume better weather conditions prevailed.

Change the weather forecast from 3 (Building) to 5 (Stable).

4. Assume the Allied diversionary attack caused Kesselring to commit his reserve divisions earlier, thus delaying their arrival at Anzio.

Delay the arrival dates of the listed units by the specified number of turns; 104/200 (5 turns), 145 Inf (5 turns), 3rd PzGr XX HQ and assets (5 turns), 1/HG (7 turns) and 2/HG (3 turns).

5. The Allies mounted a concerted effort during the Anzio campaign to bomb out German communications in order to delay the arrival of reinforcements. These measures proved to be surprisingly ineffective. Assume German reinforcements were significantly delayed by Allied bombing.

Delay the arrival dates of the listed units by the specified number of turns; 71st XX, except the 129 AA bn from the 1 Fshjr Rgt (4 turns), 1/HG (2 turns), 104/200 (2 turns) and the 145 Inf (3 turns). ◆

Programming. . .

Continued from p.22

can be accessed by machine language calls to $800 and $803 respectively.

To build your own map you must first write a create routine but if ADDRESS and BREAKHEX are understood this should not present a problem.

Lines 64 - 91: XCL and XCH are the low and high components of the address of each column. To find the address of the 7th column count along from XCL and you will find the value is $F8. XCH gives the value $41 therefore the seventh column starts in memory at location $41F8. To that value must be added 3 times the YC value (as each hex occupies 3 bytes) and the result stored. The data for that hex can be accessed by;

```
ldy  00
lda  (ML),y      ; for the first byte
iny
lda  (ML),y      ; for the second
iny
lda  (ML),y      ; for the last
```

Lines 96 - 113: HEXIND is the table to allow for the easy breakdown of adjacent hexes. MINE and CITY are the respective shapes from the shape table to be used if the mine or city symbol is to be displayed on the screen. ROADFLG is set to indicate whether a road and/or fort is in the hex.

Lines 120 - 127: All the variables are first cleared to zero. Since BREAKHEX gives the terrain of all the adjacent hexes as well as the central hex, T1 through T6 must be cleared as well as T0.

Lines 131 - 165: The 3 bytes of the central hex are accessed and reassembled.

Lines 170 - 210: $5A is now subtracted from ML/MH, the address of the central hex, and is stored in AL/AH. The appropriate line from HEXIND is calculated so that the correct adjacent hexes will be addressed. This represents a bit of 'self modifying code', i.e. the program itself is changed to address the correct data. This is not something to be encouraged but. . .

Lines 212 - 268: These lines sweep through all adjacent hexes and the relevant data is reassembled and stored. If an index of 00 is used the computer knows that the hex will be off map and T0 and TX0 is set at $FF and ST0 is set to 0.

Lines 270 - 299: As well as the top and bottom, the sides of the map must be identified and the T0, TX0 and ST0 values of those hexes must be changed as above.

Lines 302 - 327: Edge of board and coast hexsides do not need to be entered through the creation routines. Coasts are put in wherever an ocean and land hex are adjacent. The edge of the board is easy to spot as the terrain of those hexes is negative (any number above $80 is regarded as negative), so in line 304 the branch will be taken if the terrain is positive (bpl) and if negative the side is given the value 5 to indicate the map edge.

Lines 331 - 365: ROADFLG is set to indicate whether or not there is a road and/or fort in the hex. Also, by looking at the appropriate flags in ST0, a MINE or a CITY may be displayed. Finally TX0 is looked at to see if a 'foreign' shape is occupying the hex, and, if it is not zero, it is placed in the variable used to indicate the shape to be displayed (called SHAPE).

These routines have been slightly abridged from the original *Battlefront* routines but all the basic functions are there; i.e. the small amount of code that has been stripped out has nothing to do with this hex assembly.

All that is needed now is to address the high resolution screen and dump the appropriate shape onto the screen.

Actually, if you throw in a few creation routines, a bit of AI and a number of other bits and pieces you could have a fairly decent strategy game in which case we could be interested in publishing it. If, on the other hand, this feels like reading a Mongolian thesaurus then I would probably stick to playing the things and wait for self programming computers to become a reality (in which case I may be interested in a job somewhere).

I would like to thank John Smith for his help in writing this article. ◆

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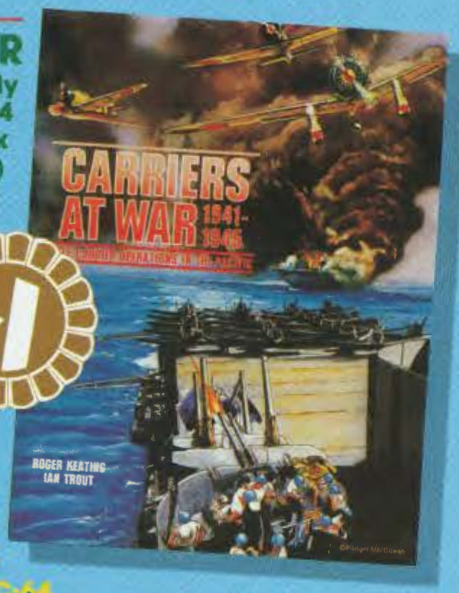

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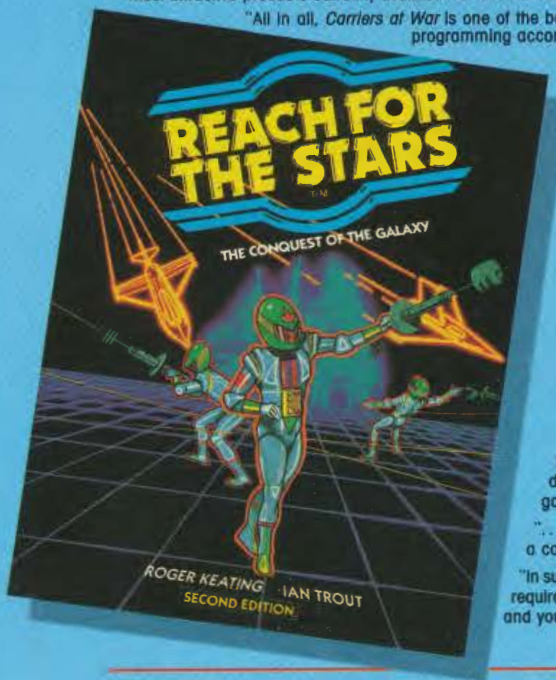

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Softalk.

"*Reach for the Stars* is a stimulating program."
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"*RFTS* is, after a little playing, a very user friendly game . . . (It) offers features to be found in no other space game. Its great artificial intelligence and careful design could only be expected after Roger Keating's many successful designs for SSI and Ian Trout's long hours of work in development. My only hope is that *RFTS* is soon followed by more games of the same quality."
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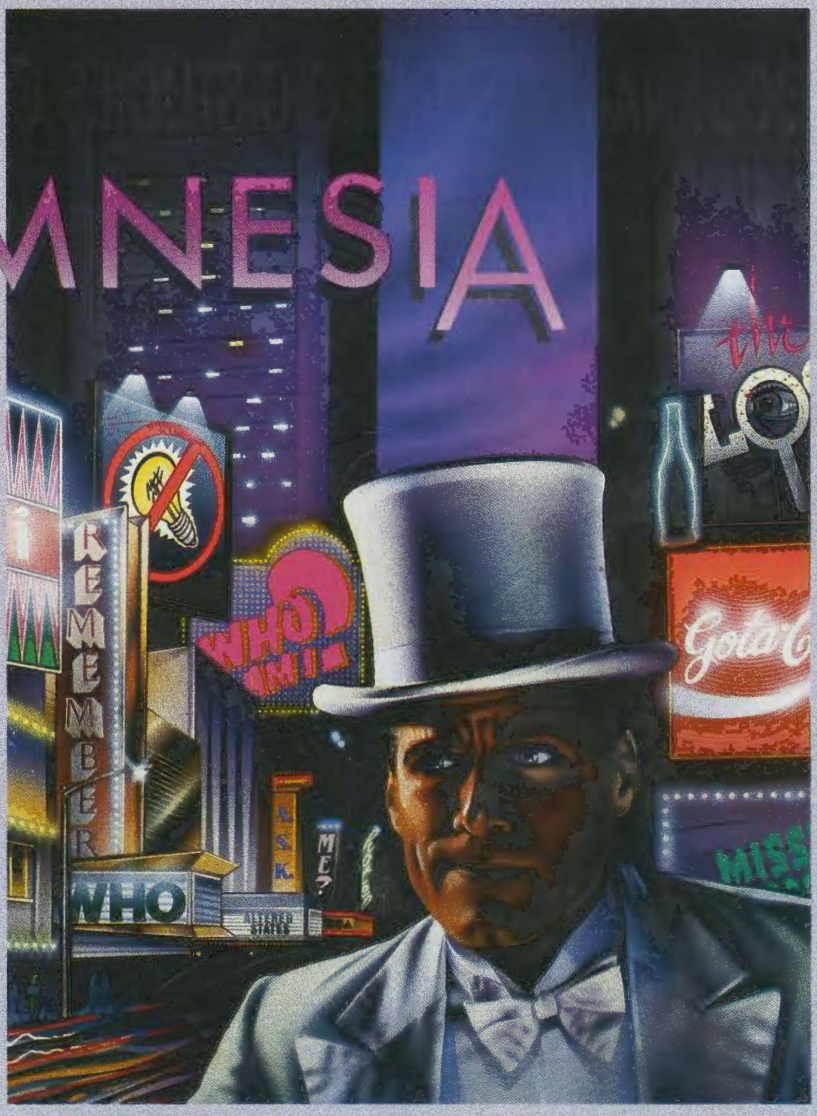

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>
> —Ask the guard for some food, thank him, then eat it and go to sleep.

A 1700-word vocabulary recognizes complicated commands in plain English.

> It feels great to be a faceless, nameless atom among a million others churning about in the grid of Manhattan's streets. It feels safe. As you approach Fifth Avenue, the brief buoyancy of feeling free gives way to ordinary now-what anxieties. You've got no money, no credit cards, nowhere to sleep, and no visible means of support.
>
> —Beg for money, then enter the subway station.

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